

S/N 10/589,366

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| NEWS | 1 | | Web Page for STN Seminar Schedule - N. America |
| NEWS | 2 | DEC 01 | ChemPort single article sales feature unavailable |
| NEWS | 3 | JUN 01 | CAS REGISTRY Source of Registration (SR) searching enhanced on STN |
| NEWS | 4 | JUN 26 | NUTRACEUT and PHARMAML no longer updated |
| NEWS | 5 | JUN 29 | IMSCOPROFILE now reloaded monthly |
| NEWS | 6 | JUN 29 | EPFULL adds Simultaneous Left and Right Truncation (SLART) to AB, MCLM, and TI fields |
| NEWS | 7 | JUL 09 | PATDPAFULL adds Simultaneous Left and Right Truncation (SLART) to AB, CLM, MCLM, and TI fields |
| NEWS | 8 | JUL 14 | USGENE enhances coverage of patent sequence location (PSL) data |
| NEWS | 9 | JUL 27 | CA/CAPplus enhanced with new citing references |
| NEWS | 10 | JUL 16 | GBFULL adds patent backfile data to 1855 |
| NEWS | 11 | JUL 21 | USGENE adds bibliographic and sequence information |
| NEWS | 12 | JUL 28 | EPFULL adds first-page images and applicant-cited references |
| NEWS | 13 | JUL 28 | INPADOCDB and INPAFAMDB add Russian legal status data |
| NEWS | 14 | AUG 10 | Time limit for inactive STN sessions doubles to 40 minutes |
| NEWS | 15 | AUG 18 | COMPENDEX indexing changed for the Corporate Source (CS) field |
| NEWS | 16 | AUG 24 | ENCOMPLIT/ENCOMPLIT2 reloaded and enhanced |
| NEWS | 17 | AUG 24 | CA/CAPplus enhanced with legal status information for U.S. patents |
| NEWS | 18 | SEP 09 | 50 Millionth Unique Chemical Substance Recorded in CAS REGISTRY |
| NEWS | 19 | SEP 11 | WPIDS, WPINDEX, and WPIX now include Japanese FTERM thesaurus |
| | | | |
| NEWS EXPRESS | MAY 26 09 | CURRENT WINDOWS VERSION IS V8.4, AND CURRENT DISCOVER FILE IS DATED 06 APRIL 2009. | |
| | | | |
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* * * * * STN Columbus * * * * *

FILE 'HOME' ENTERED AT 12:54:52 ON 17 SEP 2009

=> set abbr on perm
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=> set plurals on perm
SET COMMAND COMPLETED

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| => file uspatall caplus japio | | |
| COST IN U.S. DOLLARS | SINCE FILE | TOTAL |
| | ENTRY | SESSION |
| FULL ESTIMATED COST | 0.44 | 0.44 |

FILE 'USPATFULL' ENTERED AT 12:55:51 ON 17 SEP 2009
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FILE 'USPATOLD' ENTERED AT 12:55:51 ON 17 SEP 2009
CA INDEXING COPYRIGHT (C) 2009 AMERICAN CHEMICAL SOCIETY (ACS)

FILE 'USPAT2' ENTERED AT 12:55:51 ON 17 SEP 2009
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FILE 'JAPIO' ENTERED AT 12:55:51 ON 17 SEP 2009
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=> s us 5514763/pn
L1 2 US 5514763/PN

=> d l1 1 ibib abs

L1 ANSWER 1 OF 2 USPATFULL on STN
ACCESSION NUMBER: 96:38985 USPATFULL
TITLE: Styrene/butadiene toner resins with excellent gloss and
fix properties
INVENTOR(S): Kmiecik-Lawrynowicz, Grazyna E., Burlington, Canada
McAneney, T. Brian, Burlington, Canada
Patel, Raj D., Oakville, Canada
Hopper, Michael A., Toronto, Canada
Sanders, David J., Oakville, Canada
PATENT ASSIGNEE(S): Xerox Corporation, Stamford, CT, United States (U.S.
corporation)

| | | | | |
|-----------------------|--------------------------------------|-------|----------|-----|
| | NUMBER | KIND | DATE | |
| | ----- | ----- | ----- | |
| PATENT INFORMATION: | US 5514763 | | 19960507 | <-- |
| APPLICATION INFO.: | US 1994-312196 | | 19940926 | (8) |
| DOCUMENT TYPE: | Utility | | | |
| FILE SEGMENT: | Granted | | | |
| PRIMARY EXAMINER: | Zitomer, Fred | | | |
| LEGAL REPRESENTATIVE: | Oliff & Berridge, Palazzo, Eugene O. | | | |
| NUMBER OF CLAIMS: | 23 | | | |

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EXEMPLARY CLAIM: 1
LINE COUNT: 544

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A toner composition includes a styrene/butadiene resin having a weight average molecular weight of less than about 70,000 and a number average molecular weight of from about 8,000 to about 12,000, has a glass transition temperature of from about 50° C. to about 60° C. and provides excellent gloss and high fix properties at a low fusing temperature. The styrene/butadiene resin is produced by an emulsion polymerization process that includes forming an emulsion of a surfactant, styrene monomer, butadiene monomer and a water-soluble monomer in water, and then polymerizing the monomers in the presence of a water-soluble initiator.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

=> s us 5484840/pn
L2 2 US 5484840/PN

=> d 12 1 ibib abs

L2 ANSWER 1 OF 2 USPATFULL on STN
ACCESSION NUMBER: 96:5841 USPATFULL
TITLE: Textile sizes containing ultrafine-sized aqueous polymeric dispersions
INVENTOR(S): Binkley, Jesse A., 3770 Jim Owens Rd., NW., Kennesaw, GA, United States 30144

| | NUMBER | KIND | DATE | |
|-----------------------|--------------------------------------|------|----------|-----|
| PATENT INFORMATION: | US 5484840 | | 19960116 | <-- |
| APPLICATION INFO.: | US 1993-170565 | | 19931221 | (8) |
| DOCUMENT TYPE: | Utility | | | |
| FILE SEGMENT: | Granted | | | |
| PRIMARY EXAMINER: | Szekely, Peter A. | | | |
| LEGAL REPRESENTATIVE: | Shedden, John A., Solomon, Andrew M. | | | |
| NUMBER OF CLAIMS: | 4 | | | |
| EXEMPLARY CLAIM: | 1 | | | |
| LINE COUNT: | 733 | | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A textile sizing composition comprising one or more aqueous-based dispersions containing between about 15 and about 50 percent by weight solids wherein said solids comprise one or more polymers derived from one or more ethylenically unsaturated monomers, said solids having an average particle size of less than 100 nanometers is disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

=> s dip(1w)(formed or forming) and (zinc oxide or zno)
L3 85 DIP(1W)(FORMED OR FORMING) AND (ZINC OXIDE OR ZNO)

=> s (conjugated diene# or butadiene? or isopren?)(s)(vinyl(1a)aromatic? or styren?)
L4 262996 (CONJUGATED DIENE# OR BUTADIENE? OR ISOPREN?)(S)(VINYL(1A) AROMA TIC? OR STYREN?)

=> s 13 and 14
L5 32 L3 AND L4

S/N 10/589,366

=> d 15 1-32 ibib abs

L5 ANSWER 1 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2009:31724 USPATFULL
TITLE: STRUCTURE WITH CAPABILITY OF CONDUCTING/ABSORBING
ELECTROMAGNETIC WAVES
INVENTOR(S): Sano, Masanori, Osaka, JAPAN
Imono, Shozo, Osaka, JAPAN
Niino, Takuya, Osaka, JAPAN
PATENT ASSIGNEE(S): Nitto Denko Corporation, Ibaraki-shi, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|------------------|------|-----------------------|
| PATENT INFORMATION: | US 20090029094 | A1 | 20090129 |
| APPLICATION INFO.: | US 2006-886579 | A1 | 20060412 (11) |
| | WO 2006-JP307765 | | 20060412 |
| | | | 20070918 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2005-119225 | 20050418 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | EDWARDS ANGELL PALMER & DODGE LLP, P.O. BOX 55874, BOSTON, MA, 02205, US | |
| NUMBER OF CLAIMS: | 16 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 10 Drawing Page(s) | |
| LINE COUNT: | 3876 | |

AB Disclosed is a structure which can maintain a capability of conducting or absorbing electromagnetic waves even when an external pressure is applied thereon. The structure (1) includes a fibrous protrusion (1b) having the capability of conducting or absorbing electromagnetic waves partially arranged on a substrate (1a) so that at least a part of a fiber of the fibrous protrusion is positioned outward from a surface of the substrate (1a). The structure further includes a fiber protector (1c) arranged at least partially of a portion in a surface (1a1) of the substrate (1a) where no fibrous protrusion (1b) is arranged, in which the fiber protector is capable of suppressing or preventing the fibrous protrusion (1b) from flattening.

L5 ANSWER 2 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2008:323301 USPATFULL
TITLE: ARTICLE INCLUDING SHEET-LIKE ELECTROMAGNETIC SHIELDING
STRUCTURE
INVENTOR(S): NIINO, Takuya, Osaka, JAPAN
IMONO, Shozo, Osaka, JAPAN
SANO, Masanori, Osaka, JAPAN
PATENT ASSIGNEE(S): NITTO DENKO CORPORATION, Osaka, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080283290 | A1 | 20081120 |
| APPLICATION INFO.: | US 2007-741934 | A1 | 20070430 (11) |

| NUMBER | DATE |
|--------|-------|
| ----- | ----- |

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PRIORITY INFORMATION: JP 2006-126182 20060428
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: SUGHRUE-265550, 2100 PENNSYLVANIA AVE. NW, WASHINGTON,
DC, 20037-3213, US
NUMBER OF CLAIMS: 16
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 10 Drawing Page(s)
LINE COUNT: 4559
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates to an article to which a characteristic of shielding electromagnetic waves is imparted, which comprises at least a sheet-like electromagnetic shielding structure, the sheet-like electromagnetic shielding structure comprising a thin layer-like substrate; and a fiber convex structure section having a characteristic of conducting or absorbing electromagnetic waves, in which the said fiber convex structure section is formed at least partially on the thin layer-like substrate in such a form that at least a part of a fiber thereof is positioned outward from the surface of the thin layer-like substrate. As the article including the sheet-like electromagnetic shielding structure, an electronic device, an electronic circuit board, garment, an architectural structure, a construction material, or a transport equipped with an engine is suitable.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 3 OF 32 USPATFULL on STN
ACCESSION NUMBER: 2008:261266 USPATFULL
TITLE: LATEX COMPOSITION COMPRISING A CROSS-LINKING AGENT AND MOLDED PRODUCT THEREOF
INVENTOR(S): KOIDE, Kazuo, Yotsukaido-shi, JAPAN
PATENT ASSIGNEE(S): FOUR ROAD RESEARCH LTD., Yotsukaido-shi, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080227913 | A1 | 20080918 |
| APPLICATION INFO.: | US 2007-965629 | A1 | 20071227 (11) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. WO 2007-JP62791, filed on 26 Jun 2007, PENDING | | |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2006-180764 | 20060630 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 13 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 2788 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A carboxyl group-containing diene-based rubber latex composition comprising (a) a carboxyl group-containing diene-based rubber latex and one or more compounds selected from the following (b) to (e):

(b) an organometallic crosslinking agent containing two or more hydroxyl groups each bonded to a metal atom; (c) a cationic property-deactivated, modified polyamine-based resin, a cationic property-deactivated polyamide-epichlorohydrin resin, a cationic

property-deactivated polyamine-epichlorohydrin resin, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyvinyl alcohol, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyacrylamide, a cationic property-deactivated amine group- or quaternary ammonium base-containing carbohydrate, or a polyacrylamide, polyvinyl alcohol, or carbohydrate into which a crosslinkable functional group is introduced; (d) an anionic or nonionic polyvinyl alcohol, anionic or nonionic polyacrylamide, or anionic or nonionic carbohydrate to which a water resistant additive is added; and (e) a cationizing agent.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 4 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2008:239119 USPATFULL

TITLE: DIP FORMING LATEX COMPOSITION
CONTAINING CROSSLINKING AGENT AND DIP
FORMED ARTICLE OBTAINED THEREFROM

INVENTOR(S): Koide, Kazuo, Yotsukaido-shi, JAPAN

PATENT ASSIGNEE(S): Four Road Research Ltd., Yotsukaido-shi, JAPAN
(non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080207809 | A1 | 20080828 |
| APPLICATION INFO.: | US 2008-52964 | A1 | 20080321 (12) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 2007-965629, filed on 27 Dec 2007, PENDING Continuation-in-part of Ser. No. WO 2007-JP62791, filed on 26 Jun 2007, PENDING | | |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2006-180764 | 20060630 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 14 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 2840 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-forming composition, comprising:

a carboxyl group-containing diene-based rubber latex; and

one or more compounds selected from the following (a) to (e):

- (a) an organometallic crosslinking agent containing two or more hydroxyl groups each bonded to a metal atom;
- (b) a cationic property-deactivated modified polyamine-based resin, a cationic property-deactivated polyamide-epichlorohydrin resin, a cationic property-deactivated polyamine-epichlorohydrin resin, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyvinyl alcohol, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyacrylamide, a cationic property-deactivated amine group- or quaternary ammonium base-containing carbohydrate, or a polyacrylamide, polyvinyl alcohol, or carbohydrate into which a crosslinkable functional group is introduced;
- (c) an anionic or nonionic polyvinyl alcohol, anionic or nonionic polyacrylamide, or anionic or nonionic carbohydrate to which a water resistant additive or water-resistant polymer is added;
- (d) a water resistant polyvinyl alcohol; and

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(e) a cationizing agent.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 5 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2008:58653 USPATFULL

TITLE: Dip-Forming Composition and
Dip-Formed Article

INVENTOR(S): Kodama, Kazumi, Tokyo, JAPAN

| | NUMBER | KIND | DATE | |
|---------------------|-----------------|------|----------|--------------|
| PATENT INFORMATION: | US 20080051498 | A1 | 20080228 | |
| APPLICATION INFO.: | US 2005-791662 | A1 | 20051128 | (11) |
| | WO 2005-JP21825 | | 20051128 | |
| | | | 20070525 | PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2004-344877 | 20041129 |
| | JP 2004-347831 | 20041130 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS CHURCH, VA, 22040-0747, US | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1-14 | |
| LINE COUNT: | 1371 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-forming composition is provided, which can give a dip-formed article that exhibits good softness of touch and comfortable fittingness, an excellent tensile strength and a high flexural fatigue resistance, and which is less likely to color even when worn and subjected to working for a long time period. The above problem is solved by the dip-forming composition which is obtained by converting an organic peroxide, which is solid at 30° C. under normal pressure, to an aqueous dispersion in the presence of a surfactant and a polymeric protective colloid, adding the dispersion to a conjugated diene rubber latex, and aging the mixture. The organic peroxide is preferably dibenzoyl peroxide or dilauroyl peroxide.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 6 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2007:296435 USPATFULL

TITLE: Hydroxygallium phthalocyanines

INVENTOR(S): Lin, Liang-Bih, Rochester, NY, UNITED STATES
Lopez, Francisco J., Rochester, NY, UNITED STATES
Levy, Daniel V., Rochester, NY, UNITED STATES
Wu, Jin, Webster, NY, UNITED STATES
Kim, Yushan, Troy, MI, UNITED STATES
Chambers, John S., Rochester, NY, UNITED STATES

PATENT ASSIGNEE(S): Xerox Corporation (U.S. corporation)

| | NUMBER | KIND | DATE | |
|---------------------|----------------|------|----------|------|
| PATENT INFORMATION: | US 20070259281 | A1 | 20071108 | |
| APPLICATION INFO.: | US 2006-429500 | A1 | 20060505 | (11) |
| DOCUMENT TYPE: | Utility | | | |

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FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: George Likourezos, Esq., Carter, DeLuca, Farrell &
Schmidt, LLP, Suite 225, 445 Broad Hollow Rd.,
Melville, NY, 11747, US
NUMBER OF CLAIMS: 24
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Page(s)
LINE COUNT: 1397
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Methods for preparing Type V hydroxygallium phthalocyanine are provided.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 7 OF 32 USPATFULL on STN
ACCESSION NUMBER: 2007:171003 USPATFULL
TITLE: Composition for dip forming and
molding obtained by dip forming
INVENTOR(S): Aida, Misao, Kanagawa, JAPAN
Ishizu, Osamu, Kanagawa, JAPAN
Ota, Hisanori, Kanagawa, JAPAN

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|-----------------------|
| PATENT INFORMATION: | US 20070149693 | A1 | 20070628 |
| APPLICATION INFO.: | US 2005-589366 | A1 | 20050329 (10) |
| | WO 2005-JP5831 | | 20050329 |
| | | | 20060814 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2004-103424 | 20040331 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS CHURCH, VA, 22040-0747, US | |
| NUMBER OF CLAIMS: | 7 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 769 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-forming composition of the present invention comprises a dip-forming latex containing a copolymer obtained by copolymerizing 100 parts by weight of a monomer mixture containing 70 to 85 parts by weight of a conjugated diene monomer, 10 to 28 parts by weight of an aromatic vinyl monomer, 2 to 5 parts by weight of an ethylenically unsaturated acid monomer and 0 to 18 parts by weight of other monomer copolymerizable with these monomers, said copolymer having a toluene insoluble content of 30% by weight or more and a toluene swelling degree of 70 times or less; and a vulcanizing agent, a vulcanization accelerator and zinc oxide which are blended in said latex in amounts of 0.5 to 2 parts by weight, 0.25 to 1 part by weight and 0.5 to 1 part by weight, respectively, on the basis of 100 parts by weight of a solid content of the latex. There can be provided a dip-formed article exhibiting an excellent touch and feel, sufficient tensile strength and elongation at break and an excellent persistence of close fitting, as well as a dip-forming composition capable of providing such a dip-formed article.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

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L5 ANSWER 8 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2007:94453 USPATFULL

TITLE: DIP FORMING COMPOSITION AND
DIP FORMED ARTICLE

INVENTOR(S): Kodama, Kazumi, C/O ZEON CORPORATION, 6-1, MARUNOUCHI
2-CHOME, CHIYODA-KU, TOKYO, JAPAN

| | NUMBER | KIND | DATE |
|---------------------|-----------------|------|-----------------------|
| PATENT INFORMATION: | US 20070082152 | A1 | 20070412 |
| APPLICATION INFO.: | US 2004-578430 | A1 | 20041118 (10) |
| | WO 2004-JP17147 | | 20041118 |
| | | | 20060505 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2003-391914 | 20031121 |
| | JP 2004-79607 | 20040319 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS CHURCH, VA, 22040-0747, US | |
| NUMBER OF CLAIMS: | 31 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 914 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-formed article that has wearing comfort, excelling in not only tensile strength but also flexing fatigue and that itself does not tend to suffer coloration even when the article is worn and operation is continued; and a dip-forming composition capable of providing such a dip-formed article. There is provided a dip-forming composition comprising a conjugated diene rubber latex and an organic peroxide, wherein providing that X refers to the 10-hr half-life temperature ($^{\circ}$ C.) of organic peroxide and Y refers to the octanol-water partition coefficient of organic peroxide, the organic peroxide satisfies the formulae: $11 \geq Y \geq 2$ (1), and $100 - 2Y \geq X \geq 70 - 2Y$ (2). There is further provided a dip-formed article obtained from the composition.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 9 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2006:280789 USPATFULL

TITLE: Semiconductive belt and image forming apparatus using
the semiconductive belt

INVENTOR(S): Hara, Yukio, Minamiashigara-shi, JAPAN

PATENT ASSIGNEE(S): FUJI XEROX CO., LTD., Tokyo, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20060239726 | A1 | 20061026 |
| | US 7266333 | B2 | 20070904 |
| APPLICATION INFO.: | US 2005-293323 | A1 | 20051205 (11) |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 2005-122273 | 20050420 |

S/N 10/589,366

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: OLIFF & BERRIDGE, PLC, P.O. BOX 19928, ALEXANDRIA, VA,
22320, US
NUMBER OF CLAIMS: 14
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 4 Drawing Page(s)
LINE COUNT: 1096

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a semiconductive belt including a substrate and a surface layer, wherein: the substrate contains a resin; the Young's modulus of the substrate is 1000 to 8000 MPa; the surface layer contains a lubricant component, a fibrous filling material, and an elastic material; and the durometer hardness of the surface layer is A30/S to A70/S.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 10 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2005:154273 USPATFULL
TITLE: Elastomeric glove coating
INVENTOR(S): Janssen, Robert A., Alpharetta, GA, UNITED STATES
Johnson, David W., Alpharetta, GA, UNITED STATES
Mayberry, Pam, Roswell, GA, UNITED STATES
PATENT ASSIGNEE(S): Kimberly-Clark Worldwide, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20050132466 | A1 | 20050623 |
| APPLICATION INFO.: | US 2003-733172 | A1 | 20031211 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DORITY & MANNING, P.A., POST OFFICE BOX 1449, GREENVILLE, SC, 29602-1449, US | | |
| NUMBER OF CLAIMS: | 41 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 2 Drawing Page(s) | | |
| LINE COUNT: | 876 | | |

AB An elastomeric glove that contains a hydrogel coating is provided. The present inventors have discovered that the hydrogel coating is capable of improving donning (damp and/or dry) and also imparting certain other benefits to a wearer of the glove. Specifically, the hydrogel coating includes an active agent that is retained within a crosslinked hydrogel network. When the hydrogel coating is exposed to an aqueous environment, it swells, allowing the active agent to diffuse through pores and contact the skin of a wearer.

L5 ANSWER 11 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2005:148656 USPATFULL
TITLE: Method for forming an elastomeric article
INVENTOR(S): Modha, Shantilal Hirji, Alpharetta, GA, UNITED STATES
Kister, Mary Elizabeth, Cumming, GA, UNITED STATES
Nguyen, KC, Neenah, WI, UNITED STATES
PATENT ASSIGNEE(S): Kimberly-Clark Worldwide, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20050127552 | A1 | 20050616 |
| APPLICATION INFO.: | US 2003-733155 | A1 | 20031211 (10) |

S/N 10/589,366

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: DORITY & MANNING, P.A., POST OFFICE BOX 1449,
GREENVILLE, SC, 29602-1449, US
NUMBER OF CLAIMS: 37
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Page(s)
LINE COUNT: 920

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An elastomeric article (e.g., glove, condom, and so forth) coated with a hydrogel is provided. The hydrogel coating facilitates dry and/or damp donning. In addition, due its low coefficient of friction, the hydrogel allows stripping of a dip-formed article without the use of an antiblocking powder. Thus, the present inventors have discovered that certain treatment steps, such as chlorination and/or lubrication, conventionally conducted "off-line" (i.e., after stripping) are no longer required. Moreover, even when such treatments are used, they may conducted "in-line" (i.e., before stripping). The ability to eliminate certain off-line treatment steps provides a significant improvement in the efficiency of the forming process.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 12 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2005:13324 USPATFULL
TITLE: Latex for dip forming and molded
object obtained by dip forming
INVENTOR(S): Hagiwara, Katuo, Kawasaki, JAPAN
Ota, Hisanori, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|-----------------------|
| PATENT INFORMATION: | US 6844385 | B1 | 20050118 |
| | WO 2001000726 | | 20010104 |
| APPLICATION INFO.: | US 2001-19232 | | 20011228 (10) |
| | WO 2000-JP4169 | | 20000626 |
| | | | 20011228 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 1999-181165 | 19990628 |
| | JP 1999-182428 | 19990628 |
| | JP 1999-215284 | 19990729 |

DOCUMENT TYPE: Utility
FILE SEGMENT: GRANTED
PRIMARY EXAMINER: Yoon, Tae H.
LEGAL REPRESENTATIVE: Birch, Stewart, Kolasch & Birch, LLP
NUMBER OF CLAIMS: 8
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Figure(s); 1 Drawing Page(s)
LINE COUNT: 886

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A latex for dip forming which comprises a copolymer prepared by polymerizing 10 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 10 to 89.9% by weight of other ethylenically unsaturated monomer or monomers copolymerizable therewith, wherein the sum of the amount of acid groups bonded to or adsorbed on the surface of the copolymer constituting the latex and the amount of acid groups present

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in the aqueous phase of the copolymer latex is in the range of 0.1 to 2 meq. in terms of hydrochloric acid, per gram of the copolymer. This latex is dip-formed to give a dip-formed article having no fear of development of a protein allergy, and exhibiting a soft feeling and a high mechanical strength.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 13 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2004:168052 USPATFULL
TITLE: Coating material and molded article
INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 6759473 | B1 | 20040706 |
| | WO 2001036553 | | 20010525 |
| APPLICATION INFO.: | US 2002-129956 | | 20020520 (10) |
| | WO 2000-JP8164 | | 20001120 |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 1999-327825 | 19991118 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Reddick, Judy M. | |
| LEGAL REPRESENTATIVE: | Armstrong, Kratz, Quintos, Hanson & Brooks, LLP | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1247 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB By coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 14 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2003:334729 USPATFULL
TITLE: Antimicrobial body covering articles
INVENTOR(S): Lelah, Michael D., Arlington Heights, IL, UNITED STATES
Kampa, Joel J., Lakehills, TX, UNITED STATES
Barenberg, Sumner A., Chicago, IL, UNITED STATES
PATENT ASSIGNEE(S): Bernard Technologies, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20030235605 | A1 | 20031225 |
| | US 7449194 | B2 | 20081111 |
| APPLICATION INFO.: | US 2003-338923 | A1 | 20030108 (10) |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2002-346591P | 20020108 (60) |

S/N 10/589,366

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: SENNIGER POWERS LEAVITT AND ROEDEL, ONE METROPOLITAN
SQUARE, 16TH FLOOR, ST LOUIS, MO, 63102
NUMBER OF CLAIMS: 41
EXEMPLARY CLAIM: 1
LINE COUNT: 2089
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A polymeric body covering article that generates and releases gas upon
activation by electromagnetic energy and/or moisture. The gas provides
antimicrobial and/or antiodor protection to objects in contact or in
proximity to the interior surface of the article and/or to objects in
contact or in proximity to the exterior surface of the article.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 15 OF 32 USPATFULL on STN
ACCESSION NUMBER: 2003:322237 USPATFULL
TITLE: Elastomeric gloves having improved gripping
characteristics
INVENTOR(S): Modha, Shanti, Alpharetta, GA, UNITED STATES
Kister, Mary Elizabeth, Cumming, GA, UNITED STATES
PATENT ASSIGNEE(S): Kimberly-Clark Worldwide, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20030226191 | A1 | 20031211 |
| APPLICATION INFO.: | US 2002-161546 | A1 | 20020603 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DORITY & MANNING, P.A., POST OFFICE BOX 1449, GREENVILLE, SC, 29602-1449 | | |
| NUMBER OF CLAIMS: | 29 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Page(s) | | |
| LINE COUNT: | 1013 | | |

AB An elastomeric glove having an outer layer that contains a silicone
emulsion is provided. For example, in one embodiment, the glove contains
a natural rubber latex substrate body, a donning layer that is capable
of being chlorinated, and an outer layer formed from a silicone
emulsion. It has been unexpectedly discovered that the application of a
silicone emulsion to the outer layer can offset the slipperiness
normally caused by chlorination and thus enhance the gripping properties
of the resulting elastomeric glove. Specifically, it is believed that
the silicone emulsion can inhibit the ability of halogen atoms to bond
with the elastomeric material of the substrate, thereby limiting the
level of slipperiness usually imparted during chlorination.

L5 ANSWER 16 OF 32 USPATFULL on STN
ACCESSION NUMBER: 2003:172993 USPATFULL
TITLE: Elastomeric gloves having improved donnability
INVENTOR(S): Modha, Shanti, Alpharetta, GA, UNITED STATES
Kister, Mary Elizabeth, Cumming, GA, UNITED STATES
PATENT ASSIGNEE(S): Kimberly-Clark Worldwide, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|----------|
| PATENT INFORMATION: | US 20030118837 | A1 | 20030626 |
| | US 7329442 | B2 | 20080212 |

S/N 10/589,366

APPLICATION INFO.: US 2002-223583 A1 20020819 (10)
RELATED APPLN. INFO.: Continuation-in-part of Ser. No. US 2001-36743, filed
on 21 Dec 2001, PENDING
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: DORITY & MANNING, P.A., POST OFFICE BOX 1449,
GREENVILLE, SC, 29602-1449
NUMBER OF CLAIMS: 37
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 3 Drawing Page(s)
LINE COUNT: 1069

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An elastomeric glove that contains a donning layer containing waterborne
polyurethane and a lubricant formed from a silicone emulsion is
provided. It has discovered that the application of a waterborne
polyurethane donning layer and silicone emulsion lubricant to the inner
surface of the glove may provide both damp and dry donnability to the
resulting elastomeric glove.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 17 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2002:95510 USPATFULL
TITLE: Method for forming color image
INVENTOR(S): Taguchi, Tetsuya, Minamiashigara, JAPAN
Iizuka, Akihiro, Minamiashigara, JAPAN
Yoshihara, Koutarou, Minamiashigara, JAPAN
Yoshino, Susumu, Minamiashigara, JAPAN
Ishida, Haruhide, Minamiashigara, JAPAN
Kataoka, Rieko, Minamiashigara, JAPAN
PATENT ASSIGNEE(S): Fuji Xerox Co., Ltd., Tokyo, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|-------|--------------|
| | ----- | ----- | ----- |
| PATENT INFORMATION: | US 6379857 | B1 | 20020430 |
| APPLICATION INFO.: | US 2000-707932 | | 20001108 (9) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 2000-6957 | 20000114 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Chapman, Mark | |
| LEGAL REPRESENTATIVE: | Oliff & Berridge, PLC | |
| NUMBER OF CLAIMS: | 20 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1400 | |

AB Provided is a method for image formation capable of stably outputting
high-quality images with no image density unevenness for a long period
of time, in which the images formed are free from image defects of edge
deletions and other deletions therein and which ensures good and uniform
developability everywhere in the latent image region to be developed
with preventing the latent image support used from being degraded. The
method includes a step of forming a latent image on a latent image
support, a step of developing the latent image on the latent image
support with a two-component developer on a developer support disposed
to face the latent image support, and a step of transferring the
thus-developed toner image onto a transfer medium, wherein the developer

support is a cylindrical sleeve having a diameter of at most 20 mm or the latent image support is a cylindrical sleeve having a diameter of at most 40 mm, and the resistance of the two-component developer is at least $10 \cdot 10^{13} \Omega$ in an electric field of 2 V/ μm .

L5 ANSWER 18 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2002:25127 USPATFULL
 TITLE: Rubber glove and process for producing same
 INVENTOR(S): Nakamura, Misao, Kawasaki-shi, JAPAN
 Inoue, Toshihiro, Kawasaki-shi, JAPAN
 PATENT ASSIGNEE(S): ZEON CORPORATION, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 20020013963 | A1 | 20020207 |
| | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | A1 | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | ARMSTRONG, WESTERMAN, HATTORI,, MCLELAND & NAUGHTON, LLP, 1725 K STREET, NW, SUITE 1000, WASHINGTON, DC, 20006 | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 855 | |

AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

L5 ANSWER 19 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2001:95481 USPATFULL
 TITLE: Process for producing dip-formed rubber article
 INVENTOR(S): Ozawa, Yutaka, Tokyo, Japan
 Ohta, Hisanori, Kawasaki-shi, Japan

| | NUMBER | KIND | DATE |
|-----------------------|--|------|--------------|
| PATENT INFORMATION: | US 20010004653 | A1 | 20010621 |
| | US 6372856 | B2 | 20020416 |
| APPLICATION INFO.: | US 2001-760297 | A1 | 20010116 (9) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1999-230257, filed on 22 Jan 1999, GRANTED, Pat. No. US 6187857 A 371 of | | |

International Ser. No. WO 1997-JP2547, filed on 23 Jul 1997, UNKNOWN

| | NUMBER | DATE |
|-----------------------|---|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 1996-210493 | 19960723 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH, STEWART, KOLASCH AND BIRCH, P.O. Box 747, Falls Church, VA, 22040-0747 | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 755 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A vulcanizable dip-forming rubber latex composition comprising an unsaturated nitrile-conjugated diene copolymer rubber latex, a sulfur-containing vulcanizer, and a vulcanization accelerator comprising at least one compound selected from (i) dithiocarbamic acid compounds of the formula: ##STR1##

and (ii) zinc dithiocarbamate compounds of the formula: ##STR2##

wherein R.sub.1 and R.sub.2 are hydrocarbon groups having at least 6 carbon atoms which may be the same or different, and an optional thiazole compound. A rubber article dip-formed from the rubber latex composition has no crack occurrence, good surface luster and good vulcanization properties, and does not contain a nitrosamine, and therefore, is suitable for medical use.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 20 OF 32 USPATFULL on STN
ACCESSION NUMBER: 2001:22303 USPATFULL
TITLE: Dipping latex composition and rubber articles made therefrom by dipping
INVENTOR(S): Ozawa, Yutaka, Tokyo, Japan
Ohta, Hisanori, Kawasaki, Japan
PATENT ASSIGNEE(S): Nippon Zeon Co., Ltd., Tokyo, Japan (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|-------|--------------------------|
| | ----- | ----- | ----- |
| PATENT INFORMATION: | US 6187857 | B1 | 20010213 |
| | WO 9803584 | | 19980129 |
| APPLICATION INFO.: | US 1999-230257 | | 19990122 (9) |
| | WO 1997-JP2547 | | 19970723 |
| | | | 19990122 PCT 371 date |
| | | | 19990122 PCT 102(e) date |

| | NUMBER | DATE |
|-----------------------|--------------------------------------|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 1996-210493 | 19960723 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | Granted | |
| PRIMARY EXAMINER: | Lipman, Bernard | |
| LEGAL REPRESENTATIVE: | Birch, Stewart, Kolasch & Birch, LLP | |
| NUMBER OF CLAIMS: | 14 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 745 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

S/N 10/589,366

AB A vulcanizable dip-forming rubber latex composition comprising an unsaturated nitrile-conjugated diene copolymer rubber latex, a sulfur-containing vulcanizer, and a vulcanization accelerator comprising at least one compound selected from (i) dithiocarbamic acid compounds of the formula: ##STR1##

and (ii) zinc dithiocarbamate compounds of the formula: ##STR2##

wherein R.sub.1 and R.sub.2 are hydrocarbon groups having at least 6 carbon atoms which may be the same or different, and an optional thiazole compound. A rubber article dip-formed from the rubber latex composition has no crack occurrence, good surface luster and good vulcanization properties, and does not contain a nitrosamine, and therefore, is suitable for medical use.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 21 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2000:14304 USPATFULL
TITLE: Cut resistant polymeric films
INVENTOR(S): Wu, Zongquan, Akron, OH, United States
Harris, Frank W., Akron, OH, United States
Cheng, Stephen Z. D., Hudson, OH, United States
PATENT ASSIGNEE(S): The University of Akron, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 6021524 | | 20000208 |
| APPLICATION INFO.: | US 1997-2011 | | 19971231 (9) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Vanatta, Amy | | |
| LEGAL REPRESENTATIVE: | Renner, Kenner, Greive, Bobak, Taylor & Weber | | |
| NUMBER OF CLAIMS: | 22 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 1 Drawing Figure(s); 1 Drawing Page(s) | | |
| LINE COUNT: | 784 | | |

AB A polymeric film having increased cut resistance comprising a polymeric matrix having dispersed therein a plurality of cut resistance enhancing fibers. These films are preferably made into gloves, for example medical or industrial gloves.

L5 ANSWER 22 OF 32 USPATFULL on STN

ACCESSION NUMBER: 91:56793 USPATFULL
TITLE: Method for bonding rubbers to fibers
INVENTOR(S): Oyama, Motofumi, Yokosuka, Japan
Mori, Osamu, Yokohama, Japan
Sugi, Nagatoshi, Yokohama, Japan
PATENT ASSIGNEE(S): Nippon Zeon Co., Ltd., Tokyo, Japan (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|--------------|
| PATENT INFORMATION: | US 5032454 | | 19910716 |
| APPLICATION INFO.: | US 1989-443826 | | 19891201 (7) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 1988-220968, filed on 14 Jun 1988, now abandoned which is a continuation of Ser. No. US 1986-838152, filed on 10 Mar 1986, now abandoned | | |

| | NUMBER | DATE |
|-----------------------|-----------------------|----------|
| PRIORITY INFORMATION: | JP 1985-48571 | 19850312 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | Granted | |
| PRIMARY EXAMINER: | Gallagher, John J. | |
| LEGAL REPRESENTATIVE: | Sherman and Shalloway | |
| NUMBER OF CLAIMS: | 12 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 452 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB In a method for bonding a nitrile group-containing highly saturated polymer rubber having an iodine value of 120 or less to fibers on vulcanization, the improvement wherein fibers treated with an aqueous dispersion comprising a halogen-containing polymer latex and a resorcinol-formaldehyde resin are used.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 23 OF 32 USPATFULL on STN

ACCESSION NUMBER: 84:58352 USPATFULL

TITLE: Preparation of fabric for bonding to rubber

INVENTOR(S): Lattimer, Mary B., Hudson, OH, United States
Weber, Carl D., Copley, OH, United States
Hardt, Zbigniew R., Akron, OH, United States

PATENT ASSIGNEE(S): The B. F. Goodrich Company, New York, NY, United States
(U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|--------------|
| PATENT INFORMATION: | US 4477619 | | 19841016 |
| APPLICATION INFO.: | US 1982-433490 | | 19821008 (6) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Jacobs, Lewis T. | | |
| LEGAL REPRESENTATIVE: | Lobo, Alfred D., Januszkiewicz, Joseph | | |
| NUMBER OF CLAIMS: | 15 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 1 Drawing Figure(s); 1 Drawing Page(s) | | |
| LINE COUNT: | 800 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Reinforcing fabrics or cords, particularly those made from adhesive activated (AA) polyester yarn, or non-adhesive activated (non-AA) polyester yarn, or aramid yarn, maybe coated in a first of two dips in a two-step (double-dip) process, or more preferably in a single-step (single-dip) process, with an adhesive dispersion comprising a solid finely divided reversibly blocked polyisocyanate (RBP), having a majority of its primary particles smaller than 1 micron in average diameter, when the RBP is held in suspension as a substantially homogeneous dispersion with the aid of a hydrocarbyl disperser. The RBP is so held with less agitation than is required to produce a vortex in the dispersion. There is no "flaking" on the fabric after it is dried at a temperature higher than 250° F. for less than about 3 minutes, and heat-set at a temperature above that at which the RBP is unblocked. Vulcanized rubber goods reinforced with the coated and cured fabric or cord, characteristically fail in cohesive rubber failure.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

S/N 10/589,366

L5 ANSWER 24 OF 32 USPATFULL on STN

ACCESSION NUMBER: 84:27325 USPATFULL
TITLE: Preparation of cord for bonding to rubber
INVENTOR(S): Solomon, Thomas S., Brecksville, OH, United States
PATENT ASSIGNEE(S): The B. F. Goodrich Company, Akron, OH, United States
(U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4448813 | | 19840515 |
| APPLICATION INFO.: | US 1982-420548 | | 19820920 (6) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Lusignan, Michael R. | | |
| LEGAL REPRESENTATIVE: | Lobo, Alfred D., Colitz, Jr., Michael J., Pepper, Jr., H. F. | | |
| NUMBER OF CLAIMS: | 13 | | |
| EXEMPLARY CLAIM: | 7 | | |
| LINE COUNT: | 639 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An adhesive activated (AA) polyester cord, aramid cord, and fabrics made therefrom, may be coated in a one-step dip comprising an aqueous dispersion of a solid finely divided reversibly blocked polyisocyanate (RBP), an adhesive latex of a diene polymer, and a dispersion of an acrylic resin selected from the group consisting of a homopolymer of a monomer, or a copolymer of two or more monomers having the structure ##STR1## wherein, R represents H, methyl, ethyl, Cl or CN, and, X represents hydroxyl (OH), hydroxymethylamino (NHCH.sub.2 OH), or alkoxy (O-alkyl) having from 1 to 4 carbon atoms. Automobile tires made from fabric coated with the one-step combination R/F/L, acrylic resin and RBP dip have comparable of better properties, as evidenced by test results of tires tested to destruction, than those of tires made with fabric treated with a two-step bath, the first bath containing the RBP and the second bath containing the R/F/L and acrylic resin. The one-step coating process is ineffective with polyester cord or fabric which is not adhesive activated.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 25 OF 32 USPATFULL on STN

ACCESSION NUMBER: 76:41695 USPATFULL
TITLE: Synthetic polyisoprene rubber latex
INVENTOR(S): Hirai, Koji, Kurashiki, Japan
Okamura, Takayuki, Kurashiki, Japan
Fujii, Kiyoshi, Kurashiki, Japan
PATENT ASSIGNEE(S): Kuraray Co., Ltd., Kurashiki, Japan (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 3971746 | | 19760727 |
| APPLICATION INFO.: | US 1975-562876 | | 19750328 (5) |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 1974-36145 | 19740329 |
| | JP 1974-137878 | 19741129 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | Granted | |
| PRIMARY EXAMINER: | Welsh, M. J. | |

S/N 10/589,366

LEGAL REPRESENTATIVE: Bacon & Thomas
NUMBER OF CLAIMS: 27
EXEMPLARY CLAIM: 1
LINE COUNT: 860

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A synthetic polyisoprene rubber latex produced by emulsifying a solution of polyisoprene rubber in an organic solvent with water and removing the solvent from the resulting oil-in-water emulsion is significantly improved with respect to mechanical stability, wet gel strength and dry film strength by utilizing, as a polyisoprene rubber, a modified polyisoprene rubber prepared by introducing from about 0.03 to 20 carboxyl groups per 100 recurring units of isoprene monomer present in the synthetic cis-1,4-polyisoprene rubber.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 26 OF 32 USPATFULL on STN

ACCESSION NUMBER: 74:33752 USPATFULL

TITLE: RUBBER OVERSHOES

INVENTOR(S): Vaughan, Jr., William A., Dover, DE, United States
Clough, James, Wyoming, DE, United States(4)

PATENT ASSIGNEE(S): International Playtex Corporation, New York, NY, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 3824715 | | 19740723 |
| APPLICATION INFO.: | US 1971-207418 | | 19711213 (5) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Lawson, Patrick D. | | |
| LEGAL REPRESENTATIVE: | Fried, Stewart J., Schwab, Jeffrey A., Caputo, Michael A. | | |
| NUMBER OF CLAIMS: | 7 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Figure(s); 1 Drawing Page(s) | | |
| LINE COUNT: | 412 | | |

AB Rubber overshoes in which a flock layer is embedded in and bonded to the rubber overshoe body and, preferably, an outer rubber layer is in turn bonded to the flock layer to define the outer sole of the overshoe. The composite structure imparts improved tear-resistance to the overshoe body and increases resistance of the sole portion thereof to delamination and to abrasion, the resulting product simultaneously exhibiting an attractive, esthetically pleasing appearance.

L5 ANSWER 27 OF 32 USPATOLD on STN

ACCESSION NUMBER: 1970:62002 USPATOLD

TITLE: ADHESION OF TEXTILE FIBER TO RUBBER WITH POLYHYDRIC PHENOL FORMALDEHYDE TRIS (2 HYDROXYALKYL) ISOCYANURATE RESIN

INVENTOR(S): LOEBLE WILLIAM D JR
CESARE FRANK C

PATENT ASSIGNEE(S): UNIROYAL, INC.

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|----------|
| PATENT INFORMATION: | US 3549481 | A | 19701222 |
| APPLICATION INFO.: | US 1969-824022 | | 19690501 |

| NUMBER | DATE |
|--------|------|
|--------|------|

S/N 10/589,366

PRIORITY INFORMATION: US 1969-824022 19690506
DOCUMENT TYPE: Utility
FILE SEGMENT: GRANTED
LINE COUNT: 609
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 28 OF 32 USPAT2 on STN
ACCESSION NUMBER: 2006:280789 USPAT2
TITLE: Semiconductive belt and image forming apparatus using
the semiconductive belt
INVENTOR(S): Hara, Yukio, Minamiashigara, JAPAN
PATENT ASSIGNEE(S): Fuji Xerox Co., Ltd., Tokyo, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 7266333 | B2 | 20070904 |
| APPLICATION INFO.: | US 2005-293323 | | 20051205 (11) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2005-122273 | 20050420 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Grainger, Quana | |
| LEGAL REPRESENTATIVE: | Oliff & Berridge, PLC | |
| NUMBER OF CLAIMS: | 14 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 5 Drawing Figure(s); 4 Drawing Page(s) | |
| LINE COUNT: | 1098 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a semiconductive belt including a substrate and a surface layer, wherein: the substrate contains a resin; the Young's modulus of the substrate is 1000 to 8000 MPa; the surface layer contains a lubricant component, a fibrous filling material, and an elastic material; and the durometer hardness of the surface layer is A30/S to A70/S.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 29 OF 32 USPAT2 on STN
ACCESSION NUMBER: 2003:334729 USPAT2
TITLE: Antimicrobial body covering articles
INVENTOR(S): Lelah, Michael D., Arlington Heights, IL, UNITED STATES
Kampa, Joel J., Lakehills, TX, UNITED STATES
Barenberg, Sumner A., Chicago, IL, UNITED STATES
PATENT ASSIGNEE(S): MicroActive Corp., Reno, NV, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 7449194 | B2 | 20081111 |
| APPLICATION INFO.: | US 2003-338923 | | 20030108 (10) |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2002-346591P | 20020108 (60) |
| DOCUMENT TYPE: | Utility | |

S/N 10/589,366

FILE SEGMENT: GRANTED
PRIMARY EXAMINER: Levy, Neil
LEGAL REPRESENTATIVE: Senniger Powers
NUMBER OF CLAIMS: 16
EXEMPLARY CLAIM: 1
LINE COUNT: 2006

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A polymeric body covering article that generates and releases gas upon activation by electromagnetic energy and/or moisture. The gas provides antimicrobial and/or antiodor protection to objects in contact or in proximity to the interior surface of the article and/or to objects in contact or in proximity to the exterior surface of the article.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 30 OF 32 USPAT2 on STN
ACCESSION NUMBER: 2003:172993 USPAT2
TITLE: Elastomeric gloves having improved donnability
INVENTOR(S): Modha, Shanti, Alpharetta, GA, UNITED STATES
Kister, Mary Elizabeth, Cumming, GA, UNITED STATES
PATENT ASSIGNEE(S): Kimberly-Clark Worldwide, Inc., Neenah, WI, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 7329442 | B2 | 20080212 |
| APPLICATION INFO.: | US 2002-223583 | | 20020819 (10) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 2001-36743, filed on 21 Dec 2001, PENDING | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Dye, Rena | | |
| ASSISTANT EXAMINER: | Simone, Catherine A. | | |
| LEGAL REPRESENTATIVE: | Dority & Manning, P.A. | | |
| NUMBER OF CLAIMS: | 36 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Figure(s); 2 Drawing Page(s) | | |
| LINE COUNT: | 1071 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An elastomeric glove that contains a donning layer containing waterborne polyurethane and a lubricant formed from a silicone emulsion is provided. It has discovered that the application of a waterborne polyurethane donning layer and silicone emulsion lubricant to the inner surface of the glove may provide both damp and dry donnability to the resulting elastomeric glove.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L5 ANSWER 31 OF 32 USPAT2 on STN
ACCESSION NUMBER: 2002:25127 USPAT2
TITLE: Rubber glove and process for producing same
INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Calvert, John J. | |
| ASSISTANT EXAMINER: | Muromoto, Robert H. | |
| LEGAL REPRESENTATIVE: | Armstrong, Westerman, Hattori, McLeland & Naughton, LLP | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 815 | |

AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

L5 ANSWER 32 OF 32 USPAT2 on STN
 ACCESSION NUMBER: 2001:95481 USPAT2
 TITLE: Process for producing dip-formed rubber article
 INVENTOR(S): Ozawa, Yutaka, Tokyo, JAPAN
 Ohta, Hisanori, Kawasaki, JAPAN
 PATENT ASSIGNEE(S): Nippon Zeon Co., Ltd., Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|-------|--------------|
| | ----- | ----- | ----- |
| PATENT INFORMATION: | US 6372856 | B2 | 20020416 |
| APPLICATION INFO.: | US 2001-760297 | | 20010116 (9) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 230257, now patented, Pat. No. US 6187857 | | |

| | NUMBER | DATE |
|-----------------------|--|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 1996-210493 | 19960723 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Lipman, Bernard | |
| LEGAL REPRESENTATIVE: | Birch, Stewart, Kolasch & Birch, LLP | |
| NUMBER OF CLAIMS: | 17 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 747 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-formed rubber article is produced by dip-forming a vulcanizable rubber latex composition comprising an unsaturated nitrile-conjugated diene copolymer rubber latex, a sulfur-containing vulcanizer, and at least one vulcanization

S/N 10/589,366

accelerator selected from (i) dithiocarbamic acid compounds of the formula (1): ##STR1##

wherein R.sub.1 and R.sub.2 independently represent and hydrocarbon group having at least 6 carbon atoms, and (ii) zinc dithiocarbamate compounds of the formula (2): ##STR2##

wherein R.sub.1 and R.sub.2 are as defined above.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

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L5 ANSWER 31 OF 32 USPAT2 on STN

ACCESSION NUMBER: 2002:25127 USPAT2
TITLE: Rubber glove and process for producing same
INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Calvert, John J. | |
| ASSISTANT EXAMINER: | Muromoto, Robert H. | |
| LEGAL REPRESENTATIVE: | Armstrong, Westerman, Hattori, McLeland & Naughton, LLP | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 815 | |

SUMM Another proposal has been made wherein a slippery inner layer comprising a lubricant and a binder is formed on the skin-contacting surface of a rubber glove. In contrast to the powdered rubber glove wherein a loose dusting powder is physically adsorbed on the inner surface thereof, a rubber glove having the inner slippery layer has a benefit such that the inner slippery layer is bonded to the inner surface of the glove by a binder and thus, the lubricant does not easily fall off. For example, a medical rubber glove has been proposed in U.S. Pat. No. 4,070,713, which has an inner lubricating layer formed from a latex of carboxylated styrene-butadiene rubber having dispersed therein starch. A rubber glove has been proposed in Japanese Unexamined Patent Publication (hereinafter abbreviated to "JP-A") No. H11-61527, which has an inner lubricating layer prepared from an aqueous dispersion comprising a synthetic rubber latex, which is incapable of being coagulated with a coagulant contained in a main rubber layer of the rubber glove, said rubber latex being blended with an organic filler such as a crosslinkable polymethyl methacrylate. These proposals provide an improvement in the donning and putting-off properties, but, the improvement achieved is still not to the desired extent. Further, adhesion of the lubricant used, i.e., starch or an organic filler such as a crosslinked polymethyl methacrylate to an elastomer formed by drying of the rubber latex, is weak and thus, the lubricant tends to

fall off.

SUMM The method for forming the main rubber layer constituting the glove proper is not particularly limited, and the main rubber layer is formed from natural rubber latex, synthetic rubber latex, or a mixed rubber latex thereof by conventional dip-forming methods which include, for example, straight dipping, coagulation dipping and dry heat dipping.

SUMM As specific examples of the polymer in the latex for the coating composition, there can be mentioned a styrene-butadiene copolymer, an acrylonitrile-butadiene copolymer, an acrylic acid ester polymer and a methacrylic acid ester polymer. Of these, an acrylic acid ester polymer and a methacrylic acid ester polymer are preferable because these polymers exhibit high adhesion to the resin particles and thus, the resin particles do not fall off or do fall off only to a very slight extent.

SUMM The acrylic acid ester polymer and the methacrylic acid ester polymer comprise acrylic acid ester monomer units and/or methacrylic acid ester monomer units, and optional units of a copolymerizable ethylenically unsaturated monomer or monomers. As specific examples of the acrylic acid ester monomer and the methacrylic acid ester monomer, there can be mentioned those which are recited above as for resin particles. As specific examples of the optionally used ethylenically unsaturated monomer, there can be mentioned aromatic vinyl monomers such as styrene and α -methylstyrene, α,β -ethylenically unsaturated carboxylic acids such as acrylic acid, methacrylic acid, maleic acid, fumaric acid and monobutyl fumarate, and conjugated diene monomers such as butadiene and isoprene. Acrylate ester polymer and methacrylate ester polymer, having copolymerized therewith 0.1 to 5% by weight of an α,β -ethylenically unsaturated carboxylic acid, especially methacrylic acid, is preferable.

DETD 10 parts of sulfur, 15 parts of zinc oxide, 7 parts of titanium oxide, 0.3 part of potassium hydroxide, and 32 parts of water were mixed together to prepare a vulcanizer solution having a solid content of 50.2%. 7 parts by weight of the vulcanizer solution was mixed with 333 parts of dip forming NBR latex having a solid content of 30% to prepare a dip forming formulation having a solid content of 30.4%.

DETD The coagulant-deposited glove form was dipped in the above-mentioned dip forming NBR latex formulation for 10 seconds, and then taken out. The dip forming formulation-applied glove form was dried at 60° C. for 5 minutes, and then dipped in warm water maintained at 50° C. for 5 minutes. Thereafter the glove form was taken out and dried at 60° C. for 5 minutes to give a glove form having an NBR layer.

CLM What is claimed is:

9. The rubber glove according to claim 1, wherein the polymer latex in the coating composition comprises at least one polymer selected from the group consisting of a styrene-butadiene copolymer, an acrylonitrile-butadiene copolymer, an acrylic acid ester copolymer and a methacrylic acid ester copolymer, which polymer is dispersion-stabilized with a water-soluble polymeric material; and the resin particles in the coating composition contain 0 to 60% by weight of toluene-insoluble matter, and comprise resin particles of at least one polymer selected from the group consisting of an acrylic acid ester polymer, a methacrylic acid ester polymer, a styrene-acrylic

acid ester copolymer and a styrene-methacrylic acid ester copolymer, polyurethane, polyamide, an olefin polymer, a vinyl chloride polymer, a vinylidene chloride polymer and cellulose derivatives.

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L5 ANSWER 31 OF 32 USPAT2 on STN
AN 2002:25127 USPAT2
TI Rubber glove and process for producing same
IN Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PA Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)
PI US 6345394 B2 20020212
AI US 2001-891385 20010627 (9)
PRAI JP 2000-196240 20000629
DT Utility
FS GRANTED
REP US 3761965 Oct 1973 002/159.000 Barasch
US 4070713 Jan 1978 Stockum
US 4578826 Apr 1986 002/167.000 Adiletta
US 5570475 Nov 1996 002/161.700 Nile et al.
US 6016570 Jan 2000 002/161.700 Vande Pol et al.
EXNAM Primary Examiner: Calvert, John J.; Assistant Examiner: Muromoto, Robert H.
LREP Armstrong, Westerman, Hattori, McLeland & Naughton, LLP
CLMN Number of Claims: 10
ECL Exemplary Claim: 1
DRWN 0 Drawing Figure(s); 0 Drawing Page(s)
AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

SUMM BACKGROUND OF THE INVENTION

(1) Field of the Invention

This invention relates to a rubber glove and a process for producing the rubber glove.

The rubber glove of the present invention has an inner covering layer, bonded to a main rubber layer of the rubber glove, which inner covering layer contains resin particles partially exposed on the skin-contacting surface thereof. This rubber glove can be easily donned and put off by the partially exposed resin particles, which do not easily fall off or do fall off only to a very slight extent when the rubber glove is donned or pulled off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

(2) Description of the Related Art

The surfaces of rubber gloves made of natural rubber or synthetic rubber are sticky and not slippery. Especially when the skin-contacting inner surface of a rubber glove is not slippery, the glove cannot be easily donned and put off. To facilitate donning and putting off of the glove, a loose dusting powder is applied onto the skin-contacting inner surface. However, the applied dusting powder easily falls off upon donning or putting off the glove or during the use thereof, and, when the glove is used in a medical field including surgery, the falling dusting powder may contaminate an operated part and cause postoperative complications.

A proposal has been made wherein the skin-contacting inner surface of a glove is subjected to a chlorination treatment to form protrusions thereon making it slippery. This proposal has problems such that the treating process is difficult to control, the donning and putting-off properties cannot be enhanced to the desired extent, and the use of chlorine may cause environmental pollution.

Another proposal has been made wherein a slippery inner layer comprising a lubricant and a binder is formed on the skin-contacting surface of a rubber glove. In contrast to the powdered rubber glove wherein a loose dusting powder is physically adsorbed on the inner surface thereof, a rubber glove having the inner slippery layer has a benefit such that the inner slippery layer is bonded to the inner surface of the glove by a binder and thus, the lubricant does not easily fall off. For example, a medical rubber glove has been proposed in U.S. Pat. No. 4,070,713, which has an inner lubricating layer formed from a latex of carboxylated styrene-butadiene rubber having dispersed therein starch. A rubber glove has been proposed in Japanese Unexamined Patent Publication (hereinafter abbreviated to "JP-A") No. H11-61527, which has an inner lubricating layer prepared from an aqueous dispersion comprising a synthetic rubber latex, which is incapable of being coagulated with a coagulant contained in a main rubber layer of the rubber glove, said rubber latex being blended with an organic filler such as a crosslinkable polymethyl methacrylate. These proposals provide an improvement in the donning and putting-off properties, but, the improvement achieved is still not to the desired extent. Further, adhesion of the lubricant used, i.e., starch or an organic filler such as a crosslinked polymethyl methacrylate to an elastomer formed by drying of the rubber latex, is weak and thus, the lubricant tends to fall off.

Another rubber glove has been proposed in JP-A H8-294,930 which is made by a process comprising dipping a glove form in a rubber latex formulation to form a first rubber layer on the glove form, and then, dipping the glove form having the first rubber layer in a rubber latex formulation comprising finely divided particles of a thermoplastic resin such as an ethylene-acrylic acid copolymer resin, a rubber latex, and a blocked isocyanate, to form a second rubber layer, which constitutes an inner lubricating resin particle-containing layer of the rubber glove. By the use of a blocked isocyanate, adhesion of the thermoplastic resin particles to an elastomer derived from the rubber latex is enhanced, but, adhesion of the second rubber layer, i.e., the inner lubricating resin particle-containing layer, to the first rubber layer is poor and thus, the inner lubricating resin particle-containing layer tends to be separated from the first rubber layer.

SUMMARY OF THE INVENTION

In view of the foregoing prior art, a primary object of the present invention is to provide a rubber glove having an inner layer containing resin particles partially exposed on the skin-contacting surface thereof, which glove can easily be donned and put off, and the resin particles contained in the inner layer do not fall off, or do fall only to a very slight extent when the glove is donned or put off, and, when the inner resin particle-containing layer is placed in contact with each other, the layer does not easily stick to each other.

In accordance with the present invention, there is provided a rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, said inner covering layer being formed from a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex; said resin particles being partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface of the inner covering layer, resin particles having a maximum particle diameter in the range of 2 to 20 μm have a total projected area ratio A in the range of 5% to 50%, as defined by the following formula (1):

$$\text{Total projected area ratio } A(\%) = B/C \times 100 \quad (1)$$

where B is total projected area of the resin particles with a maximum particle diameter of 2 to 20 μm , and C is the unit area.

In accordance with the present invention, there is further provided a process for producing a rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, which comprises the step of coating one surface of a rubber glove having a main rubber layer, with a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex, to form a resin particle-containing inner covering layer on the surface of the rubber glove; the thus-formed inner covering layer having the resin particles, which are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that the above-mentioned total projected area ratio A of the resin particles, represented by the formula (1), is satisfied.

DESCRIPTION OF THE PREFERRED EMBODIMENTS

The rubber glove of the present invention comprises a main rubber layer constituting the glove proper, and an inner covering layer, bonded to the main rubber layer. The inner covering layer is formed from a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex.

The method for forming the main rubber layer constituting the glove proper is not particularly limited, and the main rubber layer is formed from natural rubber latex, synthetic rubber latex, or a mixed rubber latex thereof by conventional dip-forming methods which include, for example, straight dipping, coagulation dipping and dry heat dipping.

The thickness of the inner covering layer is not particularly limited, but it is preferably in the range of 0.1 μm and 10 μm . When the thickness is smaller than 0.1 μm , resin particles tend to fall off from the inner covering layer. In contrast, when the thickness is larger

than 10 μm , resin particles are liable to be buried within the inner covering layer, and thus, the donning and putting-off of the glove become difficult and the inner covering layer readily sticks to each other. By the term "thickness of the inner covering layer" used herein, we mean the thickness as measured at a part of the inner covering layer, in which part resin particles are not exposed on the skin-contact surface thereof, and which part is predominantly comprised of a polymer latex.

The resin constituting resin particles contained in the inner covering layer usually has a glass transition temperature of 30 to 120° C., preferably 40 to 100° C. If the glass transition temperature is too low, the rubber glove cannot easily be donned or put off, and the inner covering layer is liable to stick to each other. In contrast, if the glass transition temperature is too high, resin particles tend to fall off in a salient amount.

The resin particles contain 0 to 60% by weight, preferably 0 to 40% by weight, based on the weight of the resin particles, of toluene-insoluble matter. When the content of toluene-insoluble matter in the resin particles is too large, the resin particles tend to fall off in a salient.

The resin particles usually have a volume average particle diameter of 1 to 50 μm , preferably 1 to 30 μm , and more preferably 2 to 10 μm . If the volume average particle diameter is smaller than 1 μm , the rubber glove cannot easily be donned or put off. In contrast, if the volume average particle diameter is larger than 50 μm , the rubber glove becomes rough to the touch and uncomfortable.

The shape of the resin particles is not particularly limited, but, a spherical form is most preferable because the glove becomes soft to the touch when donned, and load imposed to individual particles upon donning is reduced and falling off thereof can be minimized.

As specific examples of the resin particles, there can be mentioned resin particles of an acrylic acid ester polymer, a methacrylic acid ester polymer, a styrene-acrylic acid ester copolymer, a styrene-methacrylic acid ester copolymer, polyurethane, polyamide, an olefin polymer, a vinyl chloride polymer, a vinylidene chloride polymer and cellulose derivatives such as nitrocellulose, cellulose acetate, cellulose acetate butyrate, cellulose propionate and ethyl cellulose. These resins may be used either alone or in combination.

Of these resin particles, resin particles of an acrylic acid ester polymer, a methacrylic acid ester polymer, a styrene-acrylic acid ester copolymer and a styrene-methacrylic acid ester copolymer are preferable because a glass transition temperature can be freely designed for these polymer resin particles.

The styrene-acrylic acid ester copolymer and the styrene-methacrylic acid ester copolymer are copolymers comprising styrene units, and acrylic acid ester units or methacrylic acid ester units, and optionally further comprising crosslinking monomer units.

The amount of styrene units is usually in the range of 60 to 95% by weight, preferably 65 to 90% by weight, based on the total monomer units. If the amount of styrene units is too small, the inner covering layer of a rubber glove tends to stick to each other. In contrast, if the amount of styrene units is too large, resin particles are liable to

fall off.

The acrylic acid ester and the methacrylic acid ester are not particularly limited, but preferably include alkyl esters of acrylic acid and alkyl esters of methacrylic acid, the alkyl group of which has 1 to 10 carbon atoms. Specific examples of the acrylic acid ester and the methacrylic acid ester, there can be mentioned methyl acrylate, ethyl acrylate, propyl acrylate, butyl acrylate and 2-ethylhexyl acrylate; and methyl methacrylate, ethyl methacrylate, propyl methacrylate, butyl methacrylate and 2-ethylhexyl methacrylate. The alkyl group in the alkyl esters may have a substituent such as a hydroxyl group, an alkoxy group, e.g., a methoxy group, and an epoxy ring. As examples of the acrylic acid ester and methacrylic acid ester having a substituent, there can be mentioned alkoxyalkyl esters such as methoxymethyl acrylate and methoxymethyl methacrylate, hydroxyalkyl esters such as 2-hydroxyethyl acrylate and 2-hydroxyethyl methacrylate, and epoxy ring-containing esters such as glycidyl acrylate and glycidyl methacrylate. The acrylic acid ester and the methacrylic acid ester may have a substituent such as, for example, halogen.

The amount of acrylic acid ester or methacrylic acid ester units is usually in the range of 5 to 50% by weight, preferably 10 to 45% by weight, based on the total monomer units. If the amount of acrylic acid ester or methacrylic acid ester units is too small, resin particles are liable to fall off. In contrast, if the amount of acrylic acid ester or methacrylic acid ester units is too large, a glove becomes difficult to don and put off, and the inner covering layer of the rubber glove tends to stick to each other.

The crosslinking monomer optionally used is a polyfunctional monomer which includes, for example, divinylbenzene, polyethylene glycol diacrylate, polyethylene glycol dimethacrylate, polypropylene glycol diacrylate, polypropylene glycol dimethacrylate, trimethylolpropane triacrylate, trimethylolpropane trimethacrylate, pentaerythritol acrylate and pentaerythritol methacrylate.

The amount of crosslinking monomer units is usually in the range of 0 to 2% by weight, preferably 0 to 1% by weight, based on the total monomer units. If the amount of crosslinking monomer units is too large, resin particles are liable to fall off.

The acrylic acid ester polymer and methacrylic acid ester polymer are polymers comprising acrylic acid ester or methacrylic acid ester units, and optionally crosslinking monomer units. As specific examples of the acrylic acid ester and the methacrylic acid ester, there can be mentioned those which are recited above as for the styrene-acrylic acid ester copolymer and the styrene-methacrylic acid ester copolymer. The acrylic acid ester and methacrylic acid ester may be used either alone or in combination.

The amount of acrylic acid ester or methacrylic acid ester units in the acrylic acid ester polymer or methacrylic acid ester polymer is preferably in the range of 98 to 100% by weight, preferably 99 to 100% by weight, based on the total monomer units. In the case where two or more kinds of acrylic acid esters and/or methacrylic acid esters are used, the kinds and amounts thereof can appropriately be chosen so that a copolymer having a desired glass transition temperature is obtained.

As specific examples of the crosslinking monomer optionally used for the preparation of the acrylic acid ester polymer and the methacrylic acid

ester polymer, there can be mentioned those which are recited above as for the styrene-acrylic acid ester copolymer and the styrene-methacrylic acid ester copolymer. The amounts of the crosslinking monomer units optionally contained in the acrylic acid ester polymer or methacrylic acid ester polymer is preferably in the range of 0 to 2% by weight, preferably 0 to 1% by weight, based on the total monomer units.

The polymerization procedure for the production of resin particles is not particularly limited. When an emulsion or suspension polymerization is carried out in an aqueous medium, an aqueous dispersion of resin particles is directly obtained. When a bulk or solution polymerization is carried out, resin particle can be obtained by removing a liquid medium and an unreacted monomer from the polymerization mixture and then pulverizing the polymer into particles.

The polymer latex used for the coating composition comprises a polymer having a glass transition temperature in the range of -50 to $+20^{\circ}$ C., preferably -40 to 0° C. If the glass transition temperature is lower than -50° C., the rubber glove is difficult to don and put off, and the inner covering layer tends to stick to each other. In contrast, if the glass transition temperature is higher than $+20^{\circ}$ C., when the rubber glove is pulled, cracks are liable to occur in the inner covering layer and the inner covering layer tends to be separated from the main rubber layer.

The polymer in the latex usually has an average volume particle diameter in the range of 0.01 to $5\text{ }\mu\text{m}$, preferably 0.03 to $2\text{ }\mu\text{m}$. If the volume average particle diameter is smaller than $0.01\text{ }\mu\text{m}$, an as-polymerized polymer latex has a high viscosity and is difficult to handle. In contrast, if the volume average particle diameter is larger than $5\text{ }\mu\text{m}$, the inner covering layer is not uniform and the resin particles tend to fall off.

As specific examples of the polymer in the latex for the coating composition, there can be mentioned a styrene-butadiene copolymer, an acrylonitrile-butadiene copolymer, an acrylic acid ester polymer and a methacrylic acid ester polymer. Of these, an acrylic acid ester polymer and a methacrylic acid ester polymer are preferable because these polymers exhibit high adhesion to the resin particles and thus, the resin particles do not fall off or do fall off only to a very slight extent.

The acrylic acid ester polymer and the methacrylic acid ester polymer comprise acrylic acid ester monomer units and/or methacrylic acid ester monomer units, and optional units of a copolymerizable ethylenically unsaturated monomer or monomers. As specific examples of the acrylic acid ester monomer and the methacrylic acid ester monomer, there can be mentioned those which are recited above as for resin particles. As specific examples of the optionally used ethylenically unsaturated monomer, there can be mentioned aromatic vinyl monomers such as styrene and α -methylstyrene, α,β -ethylenically unsaturated carboxylic acids such as acrylic acid, methacrylic acid, maleic acid, fumaric acid and monobutyl fumarate, and conjugated diene monomers such as butadiene and isoprene. Acrylate ester polymer and methacrylate ester polymer, having copolymerized therewith 0.1 to 5% by weight of an α,β -ethylenically unsaturated carboxylic acid, especially methacrylic acid, is preferable.

The polymer latex used for the coating composition can be produced by a

conventional emulsion polymerization procedure conducted in an aqueous medium by using a dispersion stabilizer, a polymerization initiator and other optional polymerization auxiliaries.

The dispersion stabilizer used is not particularly limited, but, a water-soluble polymeric material is preferably used because undesirable sticking of the inner covering layer can be avoided or minimized.

As specific examples of the polymeric material, there can be mentioned polyvinyl alcohol and modified products thereof; hydrolyzed products of copolymers of vinyl acetate with acrylic acid, methacrylic acid or maleic anhydride; neutralized products of copolymers of an ethylenically unsaturated carboxylic acid monomer with other copolymerizable ethylenically unsaturated monomer; cellulose derivatives such as alkyl cellulose, hydroxyalkyl cellulose and carboxymethyl cellulose; starch derivatives such as alkyl starch, carboxymethyl starch and oxidized starch; gum arabic and tragacanth gum; and polyalkylene glycol. Of these, polyvinyl alcohol and its modified products, and neutralized products of copolymers of an ethylenically unsaturated carboxylic acid monomer with other copolymerizable ethylenically unsaturated monomer are preferable because products having good quality are commercially readily available and products having desired properties can be easily designed.

The water-soluble polymeric material usually has a weight average molecular weight (Mw) in the range of 1,000 to 500,000, preferably 2,000 to 300,000. A polymeric material with Mw of smaller than 1,000 leads to reduction of dispersion stability. In contrast, a polymeric material with Mw of larger than 500,000 is difficult to prepare because its viscosity during polymerization is very high.

The polymerization initiator is not particularly limited, but, a water-soluble peroxide, especially a persulfate salt is preferably used because a polymer latex with enhanced stability is obtained.

The proportion of the resin particles to the polymer latex in the coating composition is not particularly limited, but, the amount of resin particles in the coating composition is usually in the range of 20 to 300 parts by weight, preferably 30 to 200 parts by weight, and more preferably 50 to 180 parts by weight, based on 100 parts by weight of the solid content of the polymer latex. If the amount of resin particles is too small, the rubber glove becomes difficult to don and put off. In contrast, if the amount of resin particles is too large, the inner covering layer becomes rigid and resin particles are liable to fall off.

The coating composition is prepared by blending a polymer latex and an aqueous dispersion of resin particles.

The coating composition usually has a solid content of 0.1 to 20% by weight, preferably 1 to 15% by weight, based on the coating composition. If the solid content is smaller than 0.1% by weight, the inner covering layer becomes thin and resin particles tend to fall off. In contrast, if the solid content is larger than 20% by weight, the inner covering layer becomes thick and resin particles are buried therein, and thus, the glove becomes difficult to don and put off, and the inner covering layer tends to stick to each other.

The coating composition usually has a viscosity in the range of 1 to 500 Pa.multidot.s, preferably 1 to 200 Pa.multidot.s. If the viscosity is smaller than 1 Pa.multidot.s, the inner covering layer formed becomes thin and resin particles tend to fall off. In contrast, if the viscosity

is larger than 500 Pa.multidot.s, the inner covering layer becomes thick and resin particles are buried therein, and thus, the glove becomes difficult to don and put off, and the inner covering layer tends to stick to each other.

Additives such as a thickener, a wetting agent, an antifoamer, a pH adjuster and an antioxidant can be added to the coating composition according to the need. If desired, a hydrophilic liquid medium such as alcohols, cellosolves, glycols and glycerin can be added to enhance drying property and film-forming property.

The rubber glove of the present invention is made by a process wherein a glove form is dipped in a rubber latex to form a main rubber layer on the glove form; and one surface of a rubber glove having the main rubber layer is coated with a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex, to form an inner resin particle-containing covering layer on the surface of the rubber glove. The procedure of coating one surface of the rubber glove is not particularly limited, and includes, for example, a procedure of dipping the rubber glove in the coating composition, and a procedure of coating the rubber glove with the coating composition by a brush or other coater.

The coating of the coating composition for forming the inner covering layer may be conducted either subsequently to the formation of the main rubber layer on a glove form, or on a separately made rubber glove. After coating of the rubber glove having the main rubber layer with the coating composition for the formation of the inner covering layer, the coating applied is dried to give a rubber glove of the present invention.

The inner covering layer, bonded to the main rubber layer, of the rubber glove of the present invention is characterized in that resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface of the inner layer, resin particles having a maximum particle diameter in the range of 2 to 20 μm have a total projected area ratio A in the range of 5% to 50%, as defined by the following formula (1):

Total projected area ratio $A(\%) = B/C \times 100$ (1)

where B is total projected area of the resin particles with a maximum particle diameter of 2 to 20 μm , and C is the unit area.

The total projected area ratio A is preferably in the range of 10 to 40%, more preferably 15 to 38%. If the total projected area is smaller than 5%, the rubber glove is difficult to don and put off, and the inner covering layer is liable to stick to each other. In contrast, if the total projected area is larger than 50%, resin particles tend to fall off in a salient amount.

By the term "projected area" used herein we mean the area projected on a photograph as taken when the skin-contacting surface of the inner covering layer of a rubber glove is observed by a scanning electron microscope. The projected area ratio can be determined by automatically measuring the total projected area of resin particles having a maximum diameter in the range of 2 to 20 μm , which particles occur within a square unit area of 100 $\mu\text{m} \times 100 \mu\text{m}$ and are not in contact with the peripheral boundary of the square unit area, by

image-processing the resin particles by an image analyzing system ("Nexus 9000" available from K.K. Nexus).

The projected area ratio of resin particles can be controlled by the volume average particle diameter of resin particles, volume average particle diameter distribution thereof and amount thereof, and the thickness of the inner covering layer, and other factors.

Considerations should preferably be given for the following characteristics for controlling the projected area ratio within the above-mentioned range.

The ratio of the thickness of the inner covering layer to the volume average particle diameter of resin particles is preferably in the range of 0.2 to 2. If this ratio is larger than 2, the greater part of resin particles is buried within the inner covering layer and only a minor amount of resin particles is exposed on the skin-contacting surface of the inner covering layer, and thus, the benefits brought by resin particles are not obtained. In contrast, if this ratio is smaller than 0.2, the greater part of resin particles is exposed on the skin-contacting surface of the inner covering layer, and thus, the benefits brought by resin particles are obtained, but the adherence of resin particles to the inner covering layer is insufficient and the resin particles are liable to fall off.

The surface configuration index S of the skin-contacting surface of the inner covering layer, as defined by the following formula (2), is preferably in the range of 50 to 200, more preferably in the range of 60 to 150, and especially preferably 70 to 130. When the surface configuration index S is within this range, a rubber glove having good and well balanced properties can be obtained.

Surface configuration index $S = D(\mu\text{m}) + A(\%)$ (2) wherein D is weight average particle diameter (μm) of resin particles as expressed by the weight average value of the maximum particle diameters of resin particles visually observed in unit area of the skin-contacting surface of the inner covering layer; and A is total projected area ratio as defined above by the formula (1).

The weight average particle diameter of resin particles can be automatically determined from the maximum diameters of resin particles occurring within a square unit area of $100\ \mu\text{m} \times 100\ \mu\text{m}$ and are not in contact with the peripheral boundary of the square unit area, by image-processing the resin particles by an image analyzing system ("Nexus 9000" available from K.K. Nexus).

DETD The invention will now be specifically described by the following working examples that by no means limit the scope of the invention. In the working examples, % and parts are % by weight and parts by weight, respectively, unless otherwise specified. Weight of a polymer latex and weight of a coating composition are expressed by the weight of a solid content.

Properties of resin particles, an inner covering layer and a glove were determined by the following methods.

(1) Volume Average Particle Diameter (μm)

The volume average particle diameter of resin particles is measured by a

Coulter LS230 (particle size analyzer available from Coulter Co.).

(2) Glass Transition Temperature ($^{\circ}$ C.)

An aqueous polymer dispersion is cast on a glass plate having frames at the peripheral edges. The cast polymer dispersion is pre-dried at 20° C. and then dried in an oven maintained at 130° C. for 30 minutes to form a polymer film. The glass transition temperature of the polymer film is measured by using a differential scanning calorimeter (DSC; "SSC 5200" available from Seiko Instruments Inc.) at an initiation temperature of -100° C. and a temperature elevation rate of 20° C./min.

(3) Content of Toluene Insoluble Matter (%)

0.5 g of the same film specimen as prepared for the measurement of glass transition temperature is weighed and dipped in 50 ml of toluene for 48 hours. Thereafter the solution is filtered by a wire mesh with a size of 100 mesh. The content (%) of toluene insoluble matter is expressed by the ratio by weight of the residual solid on the wire mesh to the weight of the film specimen.

(4) Projected Area Ratio (%) and Surface Configuration Index of Resin Particles

A flat square portion having a size of about 7 mm+about 7 mm is cut from a palm portion of a rubber glove having an inner rubber layer. The cut specimen is stuck on a measurement holder so that the inner covering layer of the glove is outwardly exposed.

The exposed surface of the stuck inner covering layer is coated with platinum at a thickness of 10 nm by using an ion coater ("QUICK AUTO COATER SC-704AT" available from Sanyu Denshi K.K.). A photograph is taken by a scanning electron microscope ("JSM-T300" available from JEOL Ltd.) at an accelerating voltage of 15 kV and 750+magnification.

The photograph is subjected to image-processing by an image analyzing system ("Nexus 9000" available from K.K. Nexus) to measure the total projected area B of resin particles with a maximum particle diameter of 2 to 20 μ m, and the weight average particle diameter C (μ m) of the resin particles exposed on the inner covering layer. The projected area ratio and the surface configuration index are calculated according to the above-mentioned formulae (1) and (2), respectively.

(5) Thickness of Inner Covering Layer (μ m)

A flat portion is cut from a palm portion of a rubber glove having an inner rubber layer. The cut flat portion is cut in a direction perpendicular to the flat plane, and the perpendicularly cut portion is stuck on a measurement holder so that the perpendicularly cut section is upwardly exposed.

The upwardly exposed section of the stuck portion is coated with platinum at a thickness of 10 nm by using an ion coater ("QUICK AUTO COATER SC-704AT" available from Sanyu Denshi K. K.). A photograph is taken by a scanning electron microscope ("JSM-T300" available from JEOL Ltd.) at an accelerating voltage of 15 kV and 1,000+ to 5,000+magnification.

The thickness of the cut flat portion is measured on a point at which

the cut flat portion is predominantly comprised of a polymer latex and at which resin particles are not exposed on the skin-contacting surface of the cut flat portion. The measurement of thickness is conducted on twenty points, and the thickness of an inner covering layer is expressed by the average value of thickness.

(6) Ease in Donning and Putting off Rubber Glove

A rubber glove is put on and then put off in a state such that the inner surface is dry, and ease of donning and putting off the dry rubber glove is evaluated (dry donning and putting-off property). Further, a rubber glove is filled with water and then water is removed, and the thus-wetted glove is put on and then put off in a wet state. Ease of putting on and putting off the wet rubber glove is evaluated (wet donning and putting-off property). The evaluation results are expressed by the following three ratings.

Rating A: Donning and putting-off can be performed smoothly.

Rating B: Donning and putting-off can be performed with some difficulty.

Rating C: Donning and putting-off are accompanied by difficulty.

(7) Falling Off of Resin Particles

Only outer face of a rubber glove having an inner cover layer having resin particles partially exposed on the surface is washed with water in clean room, and then dried in an oven maintained at 40° C. Thereafter the dried glove is turned over to prepare a rubber glove specimen having the outwardly exposed inner covering layer with partially exposed resin particles.

The rubber glove specimen is placed within a clean polyethylene bag, and the bag is strongly crumpled twenty times. Then air within the clean room is introduced into the bag and the bag is closed. The bag is shaken ten times, and the number of resin particles fallen off from the rubber glove is counted by a particle number measuring device "KM-08" available from Rion Co. Ltd.

(8) Mutual Sticking of Inner Covering Layer

A load of 9.8 kPa is imposed from outside onto a rubber glove having an inner covering layer whereby the inner covering layer is pressed against each other. The loaded glove is left standing for 24 hours in a thermo-hygrostat maintained at a temperature of 40° C. and a relative humidity of 95%. Thereafter the rubber glove is taken out, and the folded and contacted portions of the inner covering layer are pulled to peel from each other. Ease of peeling is evaluated and expressed by the following three ratings.

Rating A: Peeling is easily performed

Rating B: Large peel-strength is required

Rating C: Peeling cannot be attained

REFERENCE EXAMPLE 1

Preparation of Polymer Latex

A pressure-resistant reaction vessel equipped with a stirrer was charged with 90 parts of deionized water, and then, a monomer mixture comprising 55 parts of butyl acrylate, 44 parts of methyl methacrylate and 1 part of methacrylic acid, and 5 parts of polyvinyl alcohol having a polymerization degree of 2,400 and a saponification degree of 88% were added with stirring to prepare a monomer emulsion.

Another pressure-resistant reaction vessel equipped with a stirrer, which temperature was controllable, was charged with 57 parts of deionized water and 8 parts of ethanol, and the temperature of the content was elevated to 80° C. While the content was maintained at 80° C., an aqueous initiator solution comprising 0.5 part of ammonium persulfate dissolved in 10 parts of deionized water was added to the content. When two minutes elapsed, addition of the above-mentioned monomer emulsion to the aqueous initiator solution was commenced. The monomer addition was continued over a period of 4 hours while being stirred. After completion of the addition of monomer emulsion, the reaction mixture was further stirred for 2 hours, and then cooled to terminate polymerization. The as-obtained polymer latex had a particle diameter of 0.35 μm . Polymerization conversion was 97%. Thereafter unreacted monomers were removed and a polymer latex having a solid content of 30% was obtained.

A portion of the polymer latex was coagulated to obtain a solid copolymer. The copolymer had a glass transition temperature of -3° C.

REFERENCE EXAMPLE 2

Preparation of Resin Particles A

To 200 parts of deionized water, 2 parts of polyvinyl alcohol having a polymerization degree of 800 and a saponification degree of 88% was dissolved. To the thus-prepared solution, 80 parts of styrene, 19.7 parts of butyl acrylate, 1.0 part of t-dodecyl mercaptan, 0.3 part of divinylbenzene and 5.0 parts of benzoyl peroxide (BPO) were added, and the mixture was homogenized to obtain a fine suspension.

A temperature-controllable reaction vessel equipped with a stirrer was charged with the fine suspension, and the content was flashed with nitrogen. The temperature of the content was elevated to 90° C. to commence polymerization. When 6 hours elapsed, the reaction mixture was cooled to terminate the polymerization. Polymerization conversion was 97%. The as-obtained polymer had a volume average particle diameter of 5.1 μm . An unreacted monomer was removed and an aqueous dispersion of copolymer resin particles A having a solid content of 30% was obtained.

The copolymer constituting resin particles A had a glass transition temperature of 55° C. and the content of toluene insoluble matter was 3%.

REFERENCE EXAMPLE 3 to 5

Preparation of Resin Particles B, C and D

By the same procedures as described in Reference Example 2, resin particles B, C and D were prepared wherein the monomer composition, and the amounts of dispersion stabilizer, t-dodecyl mercaptan and benzoyl peroxide were varied as shown in Table 1. All other conditions remained

the same.

TABLE 1

| Reference Example No. | | | | |
|--|------|------|------|-----|
| 2 | 3 | 4 | 5 | |
| Resin particles | | | | |
| A | B | C | D | |
| Amounts (parts) | | | | |
| Deionized water | 200 | 200 | 200 | 200 |
| Styrene | 80 | 80 | 80 | -- |
| Methyl methacrylate | -- | -- | -- | 96 |
| Butyl acrylate | 19.7 | 19.5 | 19.7 | 3.7 |
| Divinylbenzene | 0.3 | 0.5 | 0.3 | 0.3 |
| t-Dodecyl mercaptan | 1 | 0.75 | 1 | 1 |
| Polyvinyl alcohol | 2 | 1 | 10 | 5 |
| BPO | 5 | 3 | 3 | 2 |
| Stirring conditons | | | | |
| No. of revolution (rpm) | 250 | 250 | 250 | 250 |
| Properties of resin particles | | | | |
| Volume average particle diameter (μm) | 5.1 | 6.5 | 0.5 | 2.8 |
| Glass transition temperature ($^{\circ}\text{C.}$) | 55 | 55 | 55 | 95 |
| Amount of toluene insoluble matter (%) | 3 | 42 | 3 | 10 |

EXAMPLE 1

100 parts (as solid content) of resin particles A in the form of an aqueous dispersion having a solid content of 30% prepared in Reference Example 2, and 100 parts (as solid content) of polymer latex having a solid content of 30% prepared in Reference Example 1 were mixed together. The mixture was diluted with deionized water to prepare a coating composition having a solid content of 10% and a viscosity of 10 Pa.multidot.S.

10 parts of sulfur, 15 parts of zinc oxide, 7 parts of titanium oxide, 0.3 part of potassium hydroxide, and 32 parts of water were mixed together to prepare a vulcanizer solution having a solid content of 50.2%. 7 parts by weight of the vulcanizer solution was mixed with 333 parts of dip forming NBR latex having a solid content of 30% to prepare a dip forming formulation having a solid content of 30.4%.

20 parts of calcium nitrate, 0.05 part of polyoxyethylene octyl-phenyl-ether (nonionic surface active agent) and 80 parts of deionized water were mixed together to prepare a coagulant solution having a solid content of 20.4%. A glove form was dipped in the coagulant solution for 1 minute, and then taken out therefrom. The coagulant-applied glove form was dried at 50°C. for 3 minutes thereby to deposit the coagulant on the glove form.

The coagulant-deposited glove form was dipped in the above-mentioned dip forming NBR latex formulation for 10 seconds, and then taken out. The dip forming formulation-applied glove form was dried at 60°C. for 5 minutes, and then dipped in warm water maintained at 50°C. for 5 minutes. Thereafter the glove form was taken out and dried at 60°C. for 5 minutes to give a glove form having an NBR layer.

The glove form having an NBR layer was dipped in the above-mentioned coating composition for 10 seconds, and then taken out. The coating composition-applied glove form was dried at 70° C. for 10 minutes and further heat-treated at 120° C. for 25 minutes to give a glove form having an outer solid composite rubber film. The outer solid composite rubber film was stripped from the glove form, while the solid composite rubber film was reversed to place the first deposited NBR layer on the outer surface of the reversed composite rubber film. Thus a rubber glove having a main NBR layer and an inner covering layer, bonded to the main NBR layer, was obtained, which inner covering layer contained resin particles partially exposed on the skin-contacting surface thereof.

The projected area ratio of resin particles occurring on the skin-contacting surface of the inner covering layer having a maximum particle diameter in the range of 2 to 20 μm was 15%. The resin particles, visually observed in unit area of the skin-contacting surface area, had a weight average particle diameter of 5.2 μm . The inner covering layer had a thickness of 2 μm . The properties of the rubber glove were evaluated. The results are shown in Table 2.

EXAMPLES 2 to 7, COMPARATIVE EXAMPLES 1 to 4

By the same procedures as described in Example 1, rubber gloves were manufactured wherein the kind and amount of resin particles were varied as shown in Table 2. All other conditions remained substantially the same.

In Comparative Example 3, a coating composition having a solid content of 50% was used, which was prepared by mixing together an aqueous dispersion of resin particles A prepared in Reference Example 2 with polymer latex prepared in Reference Example 1, and then distilling off water from the mixture to adjust the concentration to 50%.

Projected area ratio and weight average particle diameter of resin particles on the skin-contacting surface of each inner covering layer, and thickness of the inner covering layer were measured, and properties of rubber gloves were evaluated. The results are shown in Table 2.

TABLE 2

[illegible]

Dry donning and putting-off property A A A A A A A C A C C

Wet donning and putting-off property A A A A A A A B A B C

Resin particles falling-off property 1150 1230 2300 850 320 500 700 150 16700
450 670

Mutual sticking of inner covering layer A A A A B A A C A C C

*1:Weight average particle diameter (μm) of resin particles occurring on inner covering layer surface.

As seen from Table 2, when the projected area ratio A of resin particles occurring on the surface of the inner covering layer and having a maximum diameter of 2 to 20 μm is smaller than the range claimed in the present invention (Comparative Examples 1, 3 and 4), the inner covering layer tends to stick to each other and the glove is difficult to don and put-off. When the projected area ratio A of resin particles occurring on the surface of the inner covering layer and having a maximum diameter of 2 to 20 μm is larger than the range claimed in the present invention (Comparative Example 2), resin particles are liable to fall off in a salient amount.

In contrast, when the projected area ratio A of resin particles with a maximum diameter of 2 to 20 μm occurring in unit area of 100 μm^2 is within the range of 5 to 50% (Examples 1 to 7), the glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent when the glove is donned or pulled off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

CLM What is claimed is:

1. A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, said inner covering layer being formed from a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex; said resin particles being partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface of the inner covering layer, resin particles having a maximum particle diameter in the range of 2 to 20 μm have a total projected area ratio A in the range of 5% to 50%, as defined by the following formula (1): Total projected area ratio $A(\%) = B/C + 100$ (1) where B is total projected area of the resin particles with a maximum particle diameter of 2 to 20 μm , and C is the unit area.

2. The rubber glove according to claim 1, wherein the resin particles have a surface configuration index S, as defined by the following formula (2), of 50 to 200: Surface configuration index $S = D(\mu\text{m}) + A(\%)$ (2) wherein D is weight average particle diameter (μm) of resin particles as expressed by the weight average value of the maximum particle diameters of resin particles visually observed in unit area of the skin-contacting surface of the inner covering layer; and A is total projected area ratio as defined above by the formula (1).

3. The rubber glove according to claim 1, wherein the inner covering layer has a thickness in the range of 0.1 to 10 μm .

4. The rubber glove according to claim 1, wherein the amount of the resin particles in the coating composition is in the range of 20 to 300 parts by weight based on 100 parts by weight of the solid content of the polymer latex.

5. The rubber glove according to claim 1, wherein the resin particles in the coating composition has a volume average particle diameter in the range of 1 to 50 μm .

6. The rubber glove according to claim 1, wherein the ratio of thickness of the inner covering layer to volume average particle diameter of the resin particles in the coating composition is in the range of 0.2 to 2.

7. The rubber glove according to claim 1, wherein the resin particles in the coating composition have a glass transition temperature in the range of 30 to 120° C.

8. The rubber glove according to claim 1, wherein the resin particles contains 0 to 60% by weight of toluene-insoluble matter.

9. The rubber glove according to claim 1, wherein the polymer latex in the coating composition comprises at least one polymer selected from the group consisting of a styrene-butadiene copolymer, an acrylonitrile-butadiene copolymer, an acrylic acid ester copolymer and a methacrylic acid ester copolymer, which polymer is dispersion-stabilized with a water-soluble polymeric material; and the resin particles in the coating composition contain 0 to 60% by weight of toluene-insoluble matter, and comprise resin particles of at least one polymer selected from the group consisting of an acrylic acid ester polymer, a methacrylic acid ester polymer, a styrene-acrylic acid ester copolymer and a styrene-methacrylic acid ester copolymer, polyurethane, polyamide, an olefin polymer, a vinyl chloride polymer, a vinylidene chloride polymer and cellulose derivatives.

10. A process for producing a rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, which comprises the step of: coating one surface of a rubber glove having a main rubber layer, with a coating composition comprising a polymer latex and resin particles dispersed in the polymer latex, to form a resin particle-containing inner covering layer on the surface of the rubber glove; the thus-formed inner covering layer having resin particles, which are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface of the inner covering layer, resin particles having a maximum particle diameter in the range of 2 to 20 μm have a total projected area ratio A in the range of 5% to 50%, as defined by the following formula (1): Total projected area ratio $A(\%) = B/C + 100$ (1) where B is total projected area of the resin particles with a maximum particle diameter of 2 to 20 μm , and C is the unit area.

| | |
|------|--|
| INCL | INCLM: 002/168.000 |
| | INCLS: 002/159.000; 002/164.000; 002/161.700 |
| NCL | NCLM: 002/168.000 |
| | NCLS: 002/159.000; 002/161.700; 002/164.000 |
| IC | [7] |
| | ICM A41D019-00 |
| | IPCI A41D0019-00 [ICM,7] |
| | IPCI-2 A41D0019-00 [ICM,7] |
| | IPCR A41D0019-00 [I,C*]; A41D0019-00 [I,A] |
| EXF | 002/159; 002/164; 002/167; 002/165; 002/169 |
| ARTU | 375 |

L5 ANSWER 26 OF 32 USPATFULL on STN

ACCESSION NUMBER: 74:33752 USPATFULL

TITLE: RUBBER OVERSHOES

INVENTOR(S): Vaughan, Jr., William A., Dover, DE, United States

Clough, James, Wyoming, DE, United States(4)

PATENT ASSIGNEE(S): International Playtex Corporation, New York, NY, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
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| PRIMARY EXAMINER: | Lawson, Patrick D. | | |
| LEGAL REPRESENTATIVE: | Fried, Stewart J., Schwab, Jeffrey A., Caputo, Michael A. | | |
| NUMBER OF CLAIMS: | 7 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Figure(s); 1 Drawing Page(s) | | |
| LINE COUNT: | 412 | | |

SUMM As used herein, the term "overshoe(s)" refers to rubber, water-resistant or repellent footwear worn over conventional, leather or plastic shoes and includes those overshoe styles commonly known as boots, rubbers, galoshes or the like. This invention is particularly applicable to rubber overshoes of the stretch type, which are conventionally produced by dip-forming rather than by compression or injection molding, which have relatively thin body sidewalls, e.g., less than about 0.050 inch and which, therefore, exhibit excellent stretch characteristics. Overshoes of this type are suitably made by dipping a form made, for example, of aluminum, an aluminum alloy, or porcelain in one or more rubber latex baths. One technique for carrying out this process is described in Marx et al U.S. Pat. No. 2,617,208, granted on Nov. 11, 1952.

DETD The term "rubber(s)" referred to above or elsewhere herein comprehends any of the various known types of vulcanizable elastomers or rubbers, including natural rubber, and the synthetic rubbers comprising chloroprene, isoprene (including isoprene-isobutene copolymers and other butyl rubbers), or butadiene (e.g. butadiene-styrene or butadiene-acrylonitrile copolymers) polymer rubbers, polybutene, polysulfide and polyurethane rubbers, or the like. While any of the aforesaid rubbers may be employed in the overshoe product of this invention, natural rubber will be referred to hereinafter as illustrative.

DETD The form is then immersed in a first or latex dip 19 in which the first, relatively thick layer 13 defining the envelope or body portion of the overshoe is formed. Natural rubber latices utilized in such a dip typically have solids concentrations ranging from about 20 to 70 percent by weight. The latex dip may further include conventional additives, such as stabilizers, anti-oxidants, sulfur, zinc oxide, accelerators, and any desired colorants. Materials known in the art to be used for such purposes may suitably be employed in the latex dips used in accordance with this invention.

DETD Natural Latex Body Dip

Compound Range of Proportions by Weight (Dry)

Natural rubber latex
100 parts

S/N 10/589,366

Stabilizer 0 to 10 parts
Anti-oxidant 0 to 10 parts
Sulfur dispersion 0.25 to 8.0 parts
Zinc oxide dispersion 0.25 to 5.0 parts
Accelerator dispersion 0.25 to 5.0 parts
Colorant dispersion 0 to 15 parts

DETD Natural Latex Body
Compound Range of Proportions by
Weight (Dry)

Natural rubber latex (about 60% solids concentration)
162.00
Stabilizer 2.72
Anti-oxidant 1.67
Sulfur dispersion 2.50
Zinc oxide dispersion 3.00
Accelerator 2.20
Carbon Black colorant dispersion 4.00

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L5 ANSWER 25 OF 32 USPATFULL on STN
ACCESSION NUMBER: 76:41695 USPATFULL
TITLE: Synthetic polyisoprene rubber latex
INVENTOR(S): Hirai, Koji, Kurashiki, Japan
Okamura, Takayuki, Kurashiki, Japan
Fujii, Kiyoshi, Kurashiki, Japan
PATENT ASSIGNEE(S): Kuraray Co., Ltd., Kurashiki, Japan (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 3971746 | | 19760727 |
| APPLICATION INFO.: | US 1975-562876 | | 19750328 (5) |

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| | JP 1974-137878 | 19741129 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | Granted | |
| PRIMARY EXAMINER: | Welsh, M. J. | |
| LEGAL REPRESENTATIVE: | Bacon & Thomas | |
| NUMBER OF CLAIMS: | 27 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 860 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM The improved strength characteristics and excellent stability of the latex according to the invention will be better understood from the

working examples described hereinafter. However, it should be noted generally that the wet gel strength and dry film strength of the latex according to the invention are comparable to, or greater than, the corresponding strength values obtained with natural latex and that the latex of the invention displays excellent stability during concentration and in other process parameters including the fact that the addition of various conventional compounding ingredients, e.g., sulfur, accelerators, zinc oxide, etc. do not detract from the stability of the latex or resultant articles. Therefore, the latex of the invention can be readily processed into the dip-formed articles such as rubber gloves, medical and hygienic products, etc., in which processes unmodified IR latices such as Cariflex IR-700 (registered trademark of Shell Oil Company) have proved difficult. In practice, then, the latex of this invention may be advantageously blended with other latices such as natural latex, ordinary IR latex, styrene-butadiene copolymer latex, acrylonitrile-butadiene copolymer latex, polybutadiene latex and chloroprene latex to improve the resultant characteristics of such other latices. The proportion of the latex of the present invention to the other latices varies depending upon the solid contents, but may be as low as 10/90, preferably more than 50/50 by weight.

CLM What is claimed is:

27. Shaped rubber articles derived from polyisoprene rubber latex defined in claim 1 in admixture with a latex derived from a rubber selected from the group consisting of natural rubber, unmodified polyisoprene, styrene-butadiene copolymer, acrylonitrile-butadiene copolymer, polybutadiene and chloroprene or a mixture thereof.

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L5 ANSWER 13 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2004:168052 USPATFULL
 TITLE: Coating material and molded article
 INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
 Inoue, Toshihiro, Kawasaki, JAPAN
 PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 6759473 | B1 | 20040706 |
| | WO 2001036553 | | 20010525 |
| APPLICATION INFO.: | US 2002-129956 | | 20020520 (10) |
| | WO 2000-JP8164 | | 20001120 |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 1999-327825 | 19991118 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Reddick, Judy M. | |
| LEGAL REPRESENTATIVE: | Armstrong, Kratz, Quintos, Hanson & Brooks, LLP | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1247 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB By coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

SUMM This invention relates to a coating agent and a coated article. More particularly, it relates to a coating agent giving a coated article by coating a dip-formed article such as a glove with the coating agent, which coated article can be easily donned and put off, from which fine particles are not easily released and which has an enhanced anti-blocking property; and to a coated article made by coating a dip-formed article with the coating agent.

SUMM Dip-formed articles made from natural rubber latex or synthetic rubber latex are used, for example, as rubber gloves and finger cots. In general the skin-contacting inner surface of a rubber glove is sticky and not slippery, and the rubber glove cannot be easily donned and put off. To facilitate donning and putting off of the rubber glove, various methods have been proposed. For example, to enhance the anti-sticking property, a method of applying a dusting powder such as talc powder onto the inner surface of a glove, and a method of subjecting the inner surface of a glove to a chlorinating treatment to form protrusions on the inner surface. However, in the former method, the applied dusting powder is easily released upon donning and putting off the glove, and, when the glove is used in a medical field including surgery, the released dusting powder may contaminate an operated part and cause postoperative complications. In the latter method, the treating cost is high, the facilitation of donning and putting off cannot be enhanced to the desired extent, and the use of chlorine may cause environmental pollution.

SUMM Further, proposals of enhancing donning and putting-off properties of a glove have been made wherein an elastomer layer or a resin layer, which contains fine particles incorporated therein, is formed on the inner surface of a glove. For example, a medical rubber glove has been proposed in Japanese Examined Patent Publication No. S60-6655 (U.S. Pat. No. 4,070,713), which has an inner lubricating layer formed from a latex of carboxylated styrene-butadiene rubber having starch dispersed therein. A rubber glove has been proposed in Japanese Unexamined Patent Publication (hereinafter abbreviated to "JP-A") No. H11-61527, which has an inner lubricating resin layer formed from an aqueous dispersion comprising a synthetic rubber latex and an organic filler, which rubber latex is incapable of being coagulated with a coagulant contained in a main rubber layer of the rubber glove. These proposals provide an improvement in the donning and putting-off properties to some extent, but, the surfaces of fine particles as lubricant are partly covered with a rubber latex. Thus, the improvement in donning and putting-off properties achieved is still not to the desired extent, and the inner lubricating layer tends to stick to each other and the sticking parts are difficult to separate.

SUMM In view of the foregoing prior art, a primary object of the present invention is to provide a dip-formed article such as, for example, a rubber glove, which can easily be donned and put off, and wherein fine particles and an elastomer ingredient not released, or are released only to a very slight extent, when the glove is donned or put off, or during wearing, and the inner elastomer coating layer exhibits an enhanced anti-blocking property; and to provide a coating agent used for the dip-formed article.

- SUMM The present inventors made extensive research to achieve the above-mentioned object, and found that the aimed coated article is obtained by coating a dip-formed article with a coating agent comprising a polymer latex having incorporated there in a special dispersion stabilizer. Based on this finding, the present invention has been completed.
- SUMM In accordance with the present invention, there is further provided a coated article made by coating a dip-formed article with the above-mentioned coating agent.
- SUMM The composition of a polymer constituting the polymer latex used in the present invention is not particularly limited, and the polymer includes, for example, a styrene-butadiene copolymer, an acrylonitrile-butadiene copolymer, polymers of acrylic acid derivatives and polymers of methacrylic acid derivatives. However, when a coating layer having a high light resistance is required, a polymer having no conjugated diene units is preferably used.
- SUMM The monomers used for making the polymer latex include, for example, conjugated diene monomers, ethylenically unsaturated carboxylic acid monomers, aromatic vinyl monomers, ethylenically unsaturated carboxylic acid ester monomers, ethylenically unsaturated carboxylic acid amide monomers and ethylenically unsaturated nitrile monomers. Of these, ethylenically unsaturated carboxylic acid ester monomers are preferably used as a principal ingredient.
- SUMM The polymer constituting the polymer latex usually has a glass transition temperature of -50 to 100° C. If the glass transition temperature is too low, an inner coating layer of the coated article becomes sticky, and the coated article cannot easily be donned and put off, and has poor anti-blocking property. In contrast, if the glass transition temperature is too high, when a coated article is drawn, fine cracks are liable to occur in an inner coating layer and the inner coating layer tends to be separated from a dip-formed article.
- SUMM As specific examples of the fine inorganic particles, there can be mentioned fine particles of silica, magnesium oxide and titanium dioxide. As specific examples of the fine organic particles, there can be mentioned fine particles of acrylic resins, urethane resins, polyamide resins, olefin resins, formaldehyde resins, vinyl chloride resins, vinylidene chloride resins, nylon resins, cellulosic resins, starch, and crosslinked products thereof. These fine particles may be used either alone or as a combination of at least two kinds thereof. Of these, fine organic particles are preferable in view of enhanced adhesion to the polymer latex. Acrylic resins and acryl-styrene resins are especially preferable. Preferable fine organic particles have a glass transition temperature such that the particles are capable of being semi-molten by heat generated at a step of producing a dip-formed article. Such glass transition temperature is preferably in the range of 40 to 110° C., more preferably 50 to 90° C.
- SUMM The coated article of the present invention is made by coating a dip-formed article with the above-mentioned coating agent. The amount of coating agent is not particularly limited, but is preferably in the range of 0.1 to 2 g/m.^{sup.2}, more preferably 0.15 to 1.5 g/m.^{sup.2}.

- SUMM As specific examples of the dip-formed article, there can be mentioned gloves, finger cots and observation balloons. These dip-formed articles are made usually by conventional direct dip-forming, cohesion dip-forming and heat-sensitive dip-forming methods. The material of dip-formed article is not particularly limited, and the dip-formed article can be made from natural rubber latex or synthetic rubber latex. As specific examples of the synthetic rubber latex, there can be mentioned styrene-butadiene copolymer latex, acrylonitrile-butadiene copolymer latex and carboxyl-modified acrylonitrile-butadiene copolymer latex.
- SUMM The method of coating a dip-formed article with the coating agent usually includes, for example, a method of dipping a dip-formed article in a bath of the coating agent, and a method of applying the coating agent to a dip-formed article.
- SUMM The coating of dip-formed article can be conducted at a step following a dip-forming in the course of making a coated article from raw material, or conducted on a finished and stored dip-formed article. In either case, an as-coated dip-formed article is dried to give a coated article. The coating of dip-formed article may be conducted either on one surface or both surfaces thereof, and either on the whole surface or a part of the surface thereof.
- DETD 10 parts of sulfur, 15 parts of zinc oxide, 7 parts of titanium oxide, 0.3 part of potassium hydroxide, and 32 parts of water were mixed together to prepare a vulcanizer solution having a solid content of 50%. 7 parts by weight of the vulcanizer solution was mixed with 220 parts of dip-forming latex having a solid content of 45% to prepare a dip forming -formulation. The dip-forming latex was a carboxyl-modified acrylonitrile-butadiene copolymer latex prepared by emulsion-copolymerization of 5 parts of methacrylic acid, 28 parts of acrylonitrile and 67 parts of 1,3-butadiene.
- DETD The coagulant-deposited glove form was dipped in the above-mentioned dip-forming latex formulation for 10 seconds, and then taken out. The dip-forming formulation-applied glove form was then dried at 60° C. for 5 minutes.
- DETD Fine organic particles (A) in an amount shown in Table 1 were incorporated in each of the polymer latexes, and deionized water was added to the polymer latex mixture to obtain coating agents (b) to (h) having a total solid content of 5%, for coating a dip-formed article therewith.
- DETD To the polymer latex, styrene/acrylic copolymer resin particles having a volume average particle diameter of 5 μ m and a glass transition temperature of 55° C. (styrene/butyl acrylate=55%/45%; hereinafter referred to as "fine organic particles (B)") were added in an amount shown in Table 1, and further deionized water was added to obtain a coating agent (1) having a total solid content of 5%, for coating a dip-formed article therewith.
- DETD Deionized water was added to the polymer latex to obtain a coating agent (j) having a total solid content of 5%, for coating a dip-formed article therewith.
- DETD To each of the polymer latexes, fine organic particles (A) in an amount shown in Table 1 were incorporated, and further deionized water was

added to obtain coating agents (k) and (m) having a total solid content of 5%, for coating a dip-formed article therewith.

DETD

TABLE 1

Example Com. Ex.

1 2 3 4 5 6 7 8 9 10 1 2

Ingredients added in vessel (parts)

D ionized water 57 57 57 57 57 57 57 57 57 57 57 57

Ethanol 8 4 8 20 8 10 8 8 4 8 -- --

Composition of

monomer emulsion (parts)

D ionized water 90 100 145 190 100 100 130 115 100 90 90 90

Styrene -- -- 30 -- 50 -- -- -- -- -- --

Acrylonitrile -- -- -- -- -- 35 39 -- -- -- -- --

Ethyl acrylate -- -- 60 -- -- -- -- -- -- -- --

Butyl acrylate 55 65 -- 70 -- -- -- -- 63 18 55 65

Methyl methacrylate 44 33 10 29 -- -- 10 50 35 81 44 33

Methacrylic acid 1 2 -- 1 -- -- 1 -- 2 1 1 2

1,3-Butadiene -- -- -- -- 50 65 50 50 -- -- -- --

PVA 205 -- -- 40 80 -- -- 30 -- -- -- --

PVA 220E -- 10 -- -- 10 10 -- -- -- -- --

PVA 224E 5 -- -- -- -- -- 20 5 5 -- --

Sodium lauryl sulfate -- -- -- -- -- -- -- -- -- 5 --

SPONENPS -- -- -- -- -- -- -- -- -- 3

Properties of polymer latex

Glass transition temperature 6 -6 18 -13 -19 -37 -12 -18 -4 63 6 -6

(° C.)

Graft ratio (%) 3.6 8.6 17 35 5.2 6.5 12 16 3.7 4.2 -- --

Average particle diameter 350 270 210 150 330 290 230 200 300 330 180 230

(nm)

Latex viscosity (mPa .multidot. s) 80 250 1600 2500 120 150 1500 2200 110 90 10
25

Fine particles (parts)

Fine organic particle (A) 60 60 60 40 60 60 60 50 -- -- 60 40

Fine organic particle (B) -- -- -- -- -- -- -- -- 130 -- --

Coating agent (a) (b) (c) (d) (e) (f) (g) (h) (i) (j) (k) (m)

Properties of glove

Donning & putting off (1) A A A A A A A A A A B

Donning & putting off (2) A A A B A A A A A A A

Fine particles-releasability 300 400 600 500 400 400 300 300 300 600 1500 1200

Anti-blocking A A A A A A A A A C C

Note, SPONENPS: Sodium polyoxyethylene-nonyl-phenyl-ether sulfate

DETD According to the present invention, by coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

CLM What is claimed is:

5. A coated article made by coating a dip-formed article with the coating agent as claimed in claim 1.

CLM What is claimed is:

6. The coated article according to claim 5, wherein the dip-formed article is a glove.

CLM What is claimed is:

15. A process for producing a coated article comprising forming a dip-formed article and coating the dip-formed article with the coating agent as claimed in claim 1.

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L5 ANSWER 8 OF 32 USPATFULL on STN

ACCESSION NUMBER: 2007:94453 USPATFULL

TITLE: DIP FORMING COMPOSITION AND
DIP FORMED ARTICLE

INVENTOR(S): Kodama, Kazumi, C/O ZEON CORPORATION, 6-1, MARUNOUCHI
2-CHOME, CHIYODA-KU, TOKYO, JAPAN

| | NUMBER | KIND | DATE |
|---------------------|-----------------|------|-----------------------|
| PATENT INFORMATION: | US 20070082152 | A1 | 20070412 |
| APPLICATION INFO.: | US 2004-578430 | A1 | 20041118 (10) |
| | WO 2004-JP17147 | | 20041118 |
| | | | 20060505 PCT 371 date |

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| PRIORITY INFORMATION: | JP 2003-391914 | 20031121 |
| | JP 2004-79607 | 20040319 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS CHURCH, VA, 22040-0747, US | |
| NUMBER OF CLAIMS: | 31 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 914 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI DIP FORMING COMPOSITION AND DIP
FORMED ARTICLE

AB A dip-formed article that has wearing comfort,
excelling in not only tensile strength but also flexing fatigue and that
itself does not tend to suffer coloration even when the article is worn
and operation is continued; and a dip-forming
composition capable of providing such a dip-formed
article. There is provided a dip-forming composition
comprising a conjugated diene rubber latex and an organic peroxide,
wherein providing that X refers to the 10-hr half-life temperature
(° C.) of organic peroxide and Y refers to the octanol-water
partition coefficient of organic peroxide, the organic peroxide
satisfies the formulae: $11 \geq Y \geq 2$ (1), and
 $100 - 2Y \geq X \geq 70 - 2Y$ (2). There is further provided a
dip-formed article obtained from the composition.

SUMM The present invention relates to a dip-forming
composition and a dip-formed article.

SUMM Conventionally, as rubber gloves having high tensile strength and
excellent oil resistance, there are often used those obtained by
dip-forming of a dip-forming
composition comprising carboxylated acrylonitrile-butadiene copolymer
latex, sulfur and a curing accelerator.

SUMM For example, Patent document 1 discloses a dip-formed
rubber glove from a dip-forming composition

comprising a carboxylated acrylonitrile-butadiene rubber latex, zinc oxide, sulfur and a curing accelerator. Such a glove is very comfortable for wearing, but has poor tensile strength. So it is easy to be broken during wearing.

SUMM Further, Patent document 2 discloses a dip-formed glove from a dip-forming composition comprising a carboxylated acrylonitrile-butadiene copolymer latex, sulfur and a curing accelerator but not zinc oxide. Such a glove has high tensile strength, which reduces risk of breakage during wearing, but it is uncomfortable for wearing.

SUMM Further, Patent document 3 discloses a dip-formed rubber glove from a dip-forming composition comprising an acrylonitrile-butadiene copolymer latex containing a specific amount of carboxyl groups, a small amount of zinc oxide, a relatively large amount of sulfur and a curing accelerator. However, when one continues operation for a long time with wearing it, such a glove itself sometimes suffers coloration, which significantly lowers its commercial value.

SUMM In addition, the above-mentioned rubber glove manufactured by dip-forming of a dip-forming composition comprising sulfur and a curing accelerator as essential components, although relatively excellent in resistance to flexing fatigue, sometimes suffers coloration when one continues operation for a long time with wearing it, which significantly lowers its commercial value.

SUMM On the other hand, there has been also studied manufacturing of a dip-formed article where an organic peroxide is used as a crosslinker without using sulfur and a curing accelerator.

SUMM For example, Patent document 4 discloses a dip-formed article obtained by dip-forming of a dip-forming composition comprising a natural or synthetic rubber latex formulated with an organic peroxide such as dicumyl peroxide or di-t-butyl peroxide followed by crosslinking at a considerably high temperature in chemically inactive melted salt bath. However, such a rubber glove, although it has wearing comfort and sufficient tensile strength, has problems of coloration due to exposure to a high temperature during production and of low resistance to flexing fatigue causing crack in crotch of fingers in use for 2-3 hr.

SUMM An object of the present invention is, based on the above-mentioned viewpoint, to provide a dip-formed article having wearing comfort, excellent tensile strength and high resistance to flexing fatigue and that itself does not tend to suffer coloration even when the article is worn and operation is continued; and a dip-forming composition capable of providing such a dip-formed article.

SUMM The inventors of present invention pursued zealous studies paying attention to dip-formed articles obtained by using an organic peroxide as a crosslinker, and found that the above object can be achieved by using a dip-forming composition comprising a conjugated diene rubber latex and a specific organic peroxide. Based on this finding they completed the present invention.

SUMM Thus, the present invention provides a dip-forming

composition comprising a conjugated diene rubber latex and an organic peroxide, wherein the organic peroxide satisfies the following formulae (1) and (2), provided that X refers to the 10-hr half-life temperature ($^{\circ}$ C.) of the organic peroxide and Y refers to the octanol-water partition coefficient of the organic peroxide: $11 \geq Y \geq 2$
(1) $100 - 2Y \geq X \geq 70 - 2Y$ (2)

SUMM Further the present invention provides a dip-formed article obtained by dip-forming of the above-mentioned dip-forming composition.

SUMM The present invention provides a dip-formed article having wearing comfort, excellent tensile strength and high resistance to flexing fatigue and that itself does not tend to suffer coloration even when the article is worn and operation is continued; and a dip-forming composition capable of providing such a dip-formed article.

DETD A dip-forming composition of the present invention comprises a conjugated diene rubber latex and a specific organic peroxide.

DETD Conjugated diene rubber latex used in the present invention is not particularly limited as long as it contains conjugated diene monomer units. For example, there may be mentioned a natural rubber latex and a synthetic rubber latex obtained by emulsion polymerization of a monomeric mixture essentially comprising a conjugated diene monomer. Among them, a synthetic rubber latex is used preferably because various characteristics of the dip-formed product can be adjusted arbitrarily. A preferred synthetic rubber latex is a conjugated diene rubber latex obtained by emulsion polymerization of a monomeric mixture comprising a conjugated diene monomer, an ethylenically unsaturated acid monomer and another monomer capable of copolymerization with them. Essential use of an ethylenically unsaturated acid monomer provides a dip-formed article excellent in tensile strength.

DETD As another monomer capable of copolymerization with the conjugated diene monomer and the ethylenically unsaturated acid monomer, although not particularly limited, for example, there may be mentioned aromatic vinyl monomers such as styrene, α -methylstyrene, monochlorostyrene, dichlorostyrene, trichlorostyrene, monomethylstyrene, dimethylstyrene, trimethylstyrene, hydroxymethylstyrene and the like; ethylenically unsaturated nitrile monomers such as acrylonitrile, methacrylonitrile, 2-chloropropenenitrile, 2-butenenitrile and the like; ethylenically unsaturated carboxamide monomers such as acrylamide, methacrylamide, N,N-dimethylacrylamide, N-methylolacrylamide and the like; ethylenically unsaturated carboxylic acid alkyl ester monomers such as methyl (meth)acrylate, ethyl (meth)acrylate, butyl (meth)acrylate, 2-ethylhexyl (meth)acrylate and the like; vinyl carboxylate monomers such as vinyl acetate, vinyl propionate, vinyl barthate and the like; halogenated vinyl monomers such as vinyl chloride, chlorovinylidene, vinyl fluoride, fluorovinylidene and the like; olefin monomers such as ethylene, propylene, 1-butene, isobutene and the like; vinyl ether monomers such as methyl vinyl ether, n-propyl vinyl ether, isobutyl vinyl ether, dodecyl vinyl ether and the like; (meth)allyl compounds such as allyl acetate, methallyl acetate, allyl chloride, methallyl chloride and the like; vinylsilyl compounds such as trimethoxyvinylsilane; vinylpyridine; and N-vinylpyrrolidone and the like. These can be used alone or in a combination of two or more.

DETD Among these other monomers, aromatic vinyl monomers, ethylenically

unsaturated nitrile monomers and ethylenically unsaturated carboxylic acid alkyl ester monomers are preferably used. On the point that they provide dip-formed articles having high tensile strength, aromatic monomers and ethylenically unsaturated nitrile monomers are preferred. Furthermore, on the point that they provide dip-formed article excellent in oil resistance, ethylenically unsaturated nitrile monomers are more preferred.

DETD On the point that it provides dip-formed articles with well-balanced properties, dibenzoyl peroxide is preferably used as an organic peroxide.

DETD (Dip-Forming Compositions)

DETD A dip-forming composition of the present invention comprises the above-mentioned conjugated diene rubber latex and the above-mentioned organic peroxide.

DETD The concentration of organic peroxide dissolved in an organic solvent is, although not particularly limited, usually 5-60 wt %, and preferably 8-50 wt %. When the concentration is too low, the organic solvent tends to be difficult to remove from the dip-formed article or tends to largely remain in the article, lowering its tensile strength. Conversely, when the concentration is too high, the preparation of the solution becomes difficult.

DETD Because the dip-forming composition of present invention comprises an organic peroxide as a crosslinker, when conventionally used sulfur and/or a curing accelerator are added to the composition, the balance among physical properties of the obtained dip-formed articles tend to worsen.

DETD Further, loading of a curing accelerator is preferably 0.3 part or less by weight, more preferably 0.1 part or less by weight based on 100 parts by weight of solids content in the above-mentioned conjugated diene rubber latex. Considering the balance among physical properties of dip-formed articles, it is most preferred that neither sulfur nor curing accelerator is added.

DETD To the dip-forming composition of present invention, zinc oxide can be added if it does not substantially interfere effects of the present invention. The loading of zinc oxide is preferably 2 parts or less by weight, more preferably 1 part or less by weight and especially preferably 0.6 part or less by weight based on 100 parts by weight of solids content in the above-mentioned conjugated diene rubber latex.

DETD When an organic peroxide is dissolved in an organic solvent with boiling point of 200° C. or higher and added to a dip-forming composition, the solvent tends to remain in the dip-formed articles obtained, lowering their tensile strength. In this case, if zinc oxide is added at preferably 0.1-1 part by weight, more preferably 0.2-0.6 part by weight based on 100 parts by weight of solids content in the above-mentioned conjugated diene rubber latex, dip-formed articles excellent in balance of feel and tensile strength are obtained, although the content of the organic solvent with a boiling point of 200° C. or higher also influences the properties.

DETD To the dip-forming composition of present invention, there may properly be added conventional additives such as inorganic pigment, colorant, dispersant, pH regulator, wetting agents, preservatives, anti-bacterial agents, wax, sizing agent and the like.

DETD The concentration of solids content in dip-forming composition is preferably 20-40 wt %, more preferably 25-35 wt %.

DETD The pH value of dip-forming composition is preferably 8.5 or higher, more preferably between 9 and 11.

DETD When a dip-forming composition with the above-mentioned solid content and pH value is used, a dip-

formed article with uniform film thickness is readily manufactured.

DETD (Dip-Formed Articles)

DETD The Dip-formed article of present invention is obtained by dip-forming of the above-mentioned dip-forming composition.

DETD As a method of dip-forming, there may be used methods known in the art such as direct dipping method, anode coagulant dipping method, teague coagulant dipping method and the like. In particular, anode coagulant dipping method is preferred on the point that it readily provides articles with uniform thickness.

DETD In anode coagulant dipping method, for example, a dip-forming mold is dipped in a coagulant solution so that the coagulant adheres to its surface, and then the mold is dipped in a dip-forming composition to form a dip-formed rubber layer thereon.

DETD As a dip-forming mold, there may be used various molds such as those made of ceramics, glass, metal, plastics or the like. Shape of mold corresponds to the shape of dip-formed article, which is a final product. When the dip-formed article is a glove, the dip-forming mold may have various shapes such as one from a wrist to fingertips, one from an elbow to fingertips and the like. Furthermore, the surface of the dip-forming mold may be surface-treated such as glossing, semi-glossing, non-glossing, fabric patterning and the like on the whole or partially.

DETD The dip-formed rubber layer obtained is usually crosslinked by heat treatment

DETD Before heat treatment, the dip-formed rubber layer may be dipped in water, preferably warm water at a temperature of 30-70° C., for 1-60 min to remove water-soluble impurities (for example, excessive emulsifying agent, coagulant or the like). This step may be performed after heat treatment, but it is preferred to perform before heat treatment since water-soluble impurities are more efficiently removed.

DETD The dip-formed rubber layer thus obtained is heat-treated at 70-150° C., preferably 80-140° C., for 5-120 min for crosslinking.

DETD If the dip-formed rubber layer contains a large amount of water, a drying step at 40-100° C. for 5-60 min is optionally added before the crosslinking step.

DETD By removing the crosslinked dip-formed rubber layer from the dip-forming mold, a dip-formed article is obtained. Here, the layer may be stripped from the mold by hand or by using hydraulic pressure or compressed air.

DETD Dip-formed articles may have a surface-treated layer formed by chlorination, coating or the like on its inside and/or outside surfaces.

DETD The thickness of dip-formed article of present invention is about 0.1 to about 3 mm. In particular, it is preferably used in thin articles of 0.1-0.3 mm in thickness. As specific application, there may be mentioned medical goods such as nipples, droppers, catheter, water pillows and the like; toys or sport goods such as balloons, dolls, balls and the like; industrial articles such as pressure-molding bag, gas-storage bag and the like; gloves for surgery use, home use, agricultural use, fishery use or industrial use; and finger cots and the like. The gloves may be supported-type or unsupported-type. Among these, the articles are suitable for thin surgery gloves.

DETD Into a polymerization reactor were charged 42 parts of styrene

, 54 parts of 1,3-butadiene, 4 parts of methacrylic acid, 0.3 part of t-dodecylmercaptan, 132 parts of ion-exchanged water, 3 parts of sodium dodecylbenzenesulfonate, 0.5 part of sodium salt of β -naphthalenesulfonic acid-formalin condensate, 0.3 part of potassium persulfate and 0.05 part of sodium ethylenediaminetetraacetate. Polymerization was started with a polymerization temperature kept at 60° C.

DETD To conjugated diene rubber latex A, 5% aqueous solution of potassium hydroxide was added to adjust the pH to 10. The above emulsion was added to the latex at 45° C. so that the amount of dibenzoyl peroxide became 1 part based on 100 parts of the solids content in the latex. Further ion-exchanged water was added to obtain a dip-forming composition with solids concentration of 30% and pH value of 10.

DETD Next, the glove-mold with the coagulant adhered was dipped in the above-mentioned dip-forming composition for 6 seconds, drawn out, dried at 50° C. for 10 min, and dipped in warm water at 40° C. for 3 min to leach out water-soluble impurities.

DETD Then, the glove-mold was dried at 70° C. for 10 min followed by heat-treatment at 120° C. for 20 min to crosslink the dip-formed rubber layer. Finally, the crosslinked dip-formed rubber layer was stripped off the glove-mold to obtain a rubber glove of 0.1 mm in thickness.

DETD To conjugated diene rubber latex A, 5% aqueous solution of potassium hydroxide was added to adjust the pH value to 10, and here ion-exchanged water was added to adjust the solid content to 30%. To 100 parts of solids content in this latex 1 part of dibenzoyl peroxide was added to obtain a dip-forming composition.

DETD With use of this dip-forming composition, a rubber glove was obtained by the same procedures as Example 1 except that the crosslinking was performed at 120° C. for 30 min.

DETD 1.5 Parts of sulfur, 1 part of zinc dibutyldithiocarbamate, 1 part of zinc oxide, 1.5 parts of titanium oxide, 0.03 part of potassium hydroxide and 5.03 part of water were mixed to prepare 10.06 parts of a curing solution with solids concentration of 50%.

DETD 10.06 Parts of the above-mentioned curing solution was added to conjugated diene rubber latex A based on 100 parts of its solids content, and then 5% aqueous potassium hydroxide solution and ion-exchanged water were added to obtain a dip-forming composition with pH value of 10 and solids concentration of 30%.

DETD Except that the above dip-forming composition was used, a rubber glove was obtained by the same procedures as Example 1.

DETD Properties of this glove were evaluated and the results are shown in Table 1.

TABLE 1

| Comparative example | | | Example | | | | |
|-------------------------------|-----|-----|---------|-----|-----|-----|-----|
| 2 | 3 | 4 | 1 | 2 | 3 | 4 | 1 |
| Formulated composition (part) | | | | | | | |
| Conjugated diene rubber latex | | | A | A | A | B | A |
| A | A | A | | | | | |
| Solids content in latex | | | 100 | 100 | 100 | 100 | 100 |
| 100 | 100 | 100 | | | | | |
| Organic peroxide | | | | | | | |
| dibenzoyl peroxide | | | 1 | 0.5 | 1 | 1 | -- |

| | | | | | | | |
|-------------------------------------|------|------|------|------|------|------|------|
| dicumyl peroxide | -- | -- | -- | -- | -- | -- | 1 |
| disuccinic acid peroxide | -- | -- | -- | -- | -- | -- | -- |
| 1 | -- | -- | -- | -- | -- | -- | -- |
| 2,4-dichlorobenzoyl peroxide | -- | -- | -- | -- | -- | -- | -- |
| 1 | -- | -- | -- | -- | -- | -- | -- |
| Sulfur | -- | -- | 1.5 | -- | -- | -- | -- |
| Curing accelerator | -- | -- | 1 | -- | -- | -- | -- |
| Zinc oxide | -- | -- | -- | -- | -- | -- | -- |
| 1 | -- | -- | -- | -- | -- | -- | -- |
| Titanium oxide | -- | -- | 1.5 | -- | -- | -- | -- |
| Properties of organic peroxide | | | | | | | |
| 10-hr half-life temperature(° C.) | 73.6 | 73.6 | 73.6 | 73.6 | 73.6 | 73.6 | 73.6 |
| 116.4 | 65.9 | 52.8 | -- | -- | -- | -- | -- |
| Octanol-water partition coefficient | 3.46 | 3.46 | 3.46 | 3.46 | 3.46 | 3.46 | 5.72 |
| -0.42 | 5.37 | -- | -- | -- | -- | -- | -- |
| Properties of dip-formed article | | | | | | | |
| 300%Md (MPa) | 2.3 | 2.2 | 2.4 | 3.1 | 2.1 | 2.1 | 2.1 |
| 2.4 | 2.2 | 6.1 | -- | -- | -- | -- | -- |
| Tensile strength (MPa) | 27 | 26 | 30 | 24 | 28 | 28 | 28 |
| 29 | 28 | 27 | -- | -- | -- | -- | -- |
| Elongation (%) | 660 | 650 | 670 | 520 | 660 | 660 | 660 |
| 640 | 650 | 530 | -- | -- | -- | -- | -- |
| Color change by cupric ion | A | A | A | A | A | A | A |
| A | A | B | -- | -- | -- | -- | -- |
| Resistance to flexing fatigue (hr) | ≥6 | ≥6 | ≥6 | ≥6 | 2.5 | 2.5 | 2.5 |
| 2 | 2.5 | ≥6 | -- | -- | -- | -- | -- |

- DETD A rubber glove obtained from dip-formed composition comprising sulfur, a curing accelerator and zinc oxide has poor feel and itself tends to suffer coloration when it is worn and operation is continued (Comparative example 4).
- DETD In contrast to these comparative examples, a rubber glove obtained from the dip-forming composition of present invention has wearing comfort, excellent tensile strength and high resistance to flexing fatigue, and the glove itself does not suffer coloration during continuous operation with wearing it (Examples 1-4).
- DETD To conjugated diene rubber latex A, 5% aqueous solution of potassium hydroxide was added to adjust the pH to 10. The above-mentioned emulsion was added to this latex at 45° C. so that the amount of dibenzoyl peroxide became 0.5 part based on 100 parts of the solids content in the latex, and ion-exchanged water was further added to obtain a dip-forming composition with solids concentration of 30% and pH 10.
- DETD Except that the above dip-forming composition was used, a rubber glove was obtained by the same procedures as Example 1. Properties of this glove were measured and the results are shown in Table 2.
- DETD 5 Parts of zinc oxide was dispersed in 5 parts of ion-exchanged water to obtain an aqueous dispersion of zinc oxide.
- DETD To conjugated diene rubber latex A, 5% aqueous solution of potassium hydroxide was added to adjust the pH to 10. To this latex the above-mentioned emulsion and the dispersion of zinc oxide were added at 45° C. so that the amounts of dibenzoyl peroxide and zinc oxide became 0.3 part and 0.5 part, respectively, based on 100 parts of the solids content in

the latex. Ion-exchanged water was further added to obtain a dip-forming composition with solids concentration of 30% and pH 10.

DETD Except that the above dip-forming composition was used, a rubber glove was obtained by the same procedures as Example 1. Properties of this glove were measured and the results are shown in Table 2.

DETD 5 Parts of zinc oxide was dispersed in 5 parts of ion-exchanged water to obtain an aqueous dispersion of zinc oxide.

DETD To conjugated diene rubber latex A, 5% aqueous solution of potassium hydroxide was added to adjust the pH to 10. To this latex the above-mentioned emulsion and the dispersion of zinc oxide were added at 45° C. so that the amounts of dibenzoyl peroxide and zinc oxide became 0.5 part and 0.5 part, respectively, based on 100 parts of the solids content in the latex. Ion-exchanged water was further added to obtain a dip-forming composition with solids concentration of 30% and pH 10.

DETD Except that the above dip-forming composition was used, a rubber glove was obtained by the same procedures as Example 1. Properties of this glove were measured and the results are shown in Table 2.

TABLE 2

Example

| | 5 | 6 | 7 |
|---------------------------------------|-----|-----|-----|
| Formulated composition (part) | | | |
| Conjugated diene rubber latex | A | A | A |
| Solids content in latex | 100 | 100 | 100 |
| Organic peroxide | | | |
| benzoyl peroxide | 0.5 | 0.3 | 0.5 |
| Organic solvent | | | |
| dibutyl phthalate | 4.3 | -- | -- |
| dibutylglycol adipate | -- | 2.1 | 3.9 |
| Zinc oxide | -- | 0.5 | |
| 0.5 | | | |
| Properties of dip-formed article | | | |
| 300%Md (MPa) | 1.6 | 2.4 | 2.5 |
| Tensile strength (MPa) | 24 | 25 | 26 |
| Elongation (%) | 750 | 680 | 710 |
| Color change by cupric ion | A | A | A |
| Resistance to flexing fatigue (hr) ≥6 | | ≥6 | ≥6 |

DETD When a dip-forming composition of the present invention formulated with an organic peroxide dissolved in an organic solvent with a high boiling point, a rubber glove with well-balanced properties is obtained (Example 5).

DETD When a dip-forming composition of the present invention formulated with an organic peroxide dissolved in an organic solvent with a high boiling point and zinc oxide, a rubber glove with well-balanced properties is obtained (Examples 6 and 7).

=> d his

S/N 10/589,366

SET PLURALS ON PERM

FILE 'USPATFULL, USPATOLD, USPAT2, CAPLUS, JAPIO' ENTERED AT 12:55:51 ON
17 SEP 2009

L1 2 S US 5514763/PN
L2 2 S US 5484840/PN
L3 85 S DIP(1W) (FORMED OR FORMING) AND (ZINC OXIDE OR ZNO)
L4 262996 S (CONJUGATED DIENE# OR BUTADIENE? OR ISOPREN?) (S) (VINYL(1A)ARO
L5 32 S L3 AND L4

=>

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LOGINID:sssptaul55fxt

PASSWORD:

TERMINAL (ENTER 1, 2, 3, OR ?):2

* * * * * Welcome to STN International * * * * *

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NEWS 3 JUN 01 CAS REGISTRY Source of Registration (SR) searching
enhanced on STN
NEWS 4 JUN 26 NUTRACEUT and PHARMAML no longer updated
NEWS 5 JUN 29 IMSCOPROFILE now reloaded monthly
NEWS 6 JUN 29 EPFULL adds Simultaneous Left and Right Truncation
(SLART) to AB, MCLM, and TI fields
NEWS 7 JUL 09 PATDPAFULL adds Simultaneous Left and Right
Truncation (SLART) to AB, CLM, MCLM, and TI fields
NEWS 8 JUL 14 USGENE enhances coverage of patent sequence location
(PSL) data
NEWS 9 JUL 27 CA/CAPLUS enhanced with new citing references
NEWS 10 JUL 16 GBFULL adds patent backfile data to 1855
NEWS 11 JUL 21 USGENE adds bibliographic and sequence information
NEWS 12 JUL 28 EPFULL adds first-page images and applicant-cited
references
NEWS 13 JUL 28 INPADOCDB and INPAFAMDB add Russian legal status data
NEWS 14 AUG 10 Time limit for inactive STN sessions doubles to 40
minutes
NEWS 15 AUG 18 COMPENDEX indexing changed for the Corporate Source
(CS) field
NEWS 16 AUG 24 ENCOMPLIT/ENCOMPLIT2 reloaded and enhanced
NEWS 17 AUG 24 CA/CAPLUS enhanced with legal status information for
U.S. patents
NEWS 18 SEP 09 50 Millionth Unique Chemical Substance Recorded in
CAS REGISTRY
NEWS 19 SEP 11 WPIDS, WPINDEX, and WPIX now include Japanese FTERM
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AND CURRENT DISCOVER FILE IS DATED 06 APRIL 2009.

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* * * * * STN Columbus * * * * *

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=> set abbr on perm
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```
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```
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| | | |
|----------------------|------------------|---------------|
| COST IN U.S. DOLLARS | SINCE FILE ENTRY | TOTAL SESSION |
| FULL ESTIMATED COST | 0.44 | 0.44 |

FILE 'USPATFULL' ENTERED AT 13:52:48 ON 17 SEP 2009
CA INDEXING COPYRIGHT (C) 2009 AMERICAN CHEMICAL SOCIETY (ACS)

FILE 'USPATOLD' ENTERED AT 13:52:48 ON 17 SEP 2009
CA INDEXING COPYRIGHT (C) 2009 AMERICAN CHEMICAL SOCIETY (ACS)

FILE 'USPAT2' ENTERED AT 13:52:48 ON 17 SEP 2009
CA INDEXING COPYRIGHT (C) 2009 AMERICAN CHEMICAL SOCIETY (ACS)

FILE 'CAPLUS' ENTERED AT 13:52:48 ON 17 SEP 2009
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FILE 'JAPIO' ENTERED AT 13:52:48 ON 17 SEP 2009
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```
=> s dip(1a)(formed or forming) and zinc(2a)oxide#
L1          316 DIP(1A)(FORMED OR FORMING) AND ZINC(2A) OXIDE#
```

```
=> s carboxy?(4a)((styren?(1a)(butadien? or isopren?))(4a)(rubber# or elastomer###))
L2      3372 CARBOXY?(4A)((STYREN?(1A)(BUTADIEN? OR ISOPREN?))(4A)(RUBBER#
      OR ELASTOMER###))
```

$$\Rightarrow s \text{ l1 and l2}$$
$$\Rightarrow d_{13} = 1 - 13 \text{ ibib abs}$$

L3 ANSWER 1 OF 13 USPATFULL on STN
ACCESSION NUMBER: 2009:209761 USPATFULL
TITLE: Polymer Bonded Fibrous Coating on Dipped Rubber
Articles Skin Contacting External Surface

S/N 10/589,366

INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA
Lucas, David M., Petaling Jaya Selangor, MALAYSIA
Mustafa, Nuzaimah Binti, Melaka, MALAYSIA
PATENT ASSIGNEE(S): Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090188019 | A1 | 20090730 |
| APPLICATION INFO.: | US 2009-408336 | A1 | 20090320 (12) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 2003-741413, filed on 19 Dec 2003, Pat. No. US 7037579 Continuation-in-part of Ser. No. US 2006-355325, filed on 16 Feb 2006, Pat. No. US 7527828 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DIEHL SERVILLA LLC, 77 BRANT AVE, SUITE 210, CLARK, NJ, 07066, US | | |
| NUMBER OF CLAIMS: | 21 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Page(s) | | |
| LINE COUNT: | 852 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A latex glove article with a fibrous coating bonded to the skin-contacting surface. Long length soft moisture absorbing fibers are attached to latex layer of a glove with a thin layer of polymeric latex adhesive forming a fibrous lining. The long length fibers have a length ranging from 4 to 100 times the thickness of the polymeric latex adhesive layer and therefore extend or project from the polymeric latex adhesive coating. The fibers penetrate the polymeric latex adhesive layer at one end or both end of the fiber to a depth of about 60% to about 100% of the adhesive thickness, leaving a substantial portion of the fiber available for soft contact with skin and sweat absorption. Due to the substantial thickness of the fibrous lining, an air gap is created between skin and the impervious latex layer establishing continual evaporation of absorbed sweat and evaporative cooling.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 2 OF 13 USPATFULL on STN
ACCESSION NUMBER: 2008:261273 USPATFULL
TITLE: THIN WALLED POLYNITRILE OXIDE CROSSLINKED RUBBER FILM PRODUCTS AND METHODS OF MANUFACTURE THEREOF
INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
Ginter, Whitney Williams, Solana Beach, CA, UNITED STATES
Herrick, Scott W., San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): Apex Medical Technologies, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080227921 | A1 | 20080918 |
| APPLICATION INFO.: | US 2007-870998 | A1 | 20071011 (11) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2005-45938, filed on 28 Jan 2005, Pat. No. US 7294678 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DARBY & DARBY P.C., P.O. BOX 770, Church Street Station, New York, NY, 10008-0770, US | | |
| NUMBER OF CLAIMS: | 18 | | |

S/N 10/589,366

EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Page(s)
LINE COUNT: 1598
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Natural rubber and/or synthetic polyisoprene film products having enhanced tear strength and tensile strength crosslinked with a one polynitrile oxide, intended for direct or indirect contact with living tissue or fluids to be placed in living organisms.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 3 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2006:203251 USPATFULL
TITLE: Thin walled polynitrile oxide crosslinked rubber film products and methods of manufacture thereof
INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
Williams, Whitney A., Solana Beach, CA, UNITED STATES
Herrick, Scott W., San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): Regent Medical Limited (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20060173137 | A1 | 20060803 |
| | US 7294678 | B2 | 20071113 |
| APPLICATION INFO.: | US 2005-45938 | A1 | 20050128 (11) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DARBY & DARBY P.C., P. O. BOX 5257, NEW YORK, NY, 10150-5257, US | | |
| NUMBER OF CLAIMS: | 18 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 1 Drawing Page(s) | | |
| LINE COUNT: | 1622 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Natural rubber and/or synthetic polyisoprene film products having enhanced tear strength and tensile strength crosslinked with a one polynitrile oxide, intended for direct or indirect contact with living tissue or fluids to be placed in living organisms.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 4 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2006:166660 USPATFULL
TITLE: Polymer composite fibrous coating on dipped rubber articles and method
INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA
Lucas, David Mark, Petaling Jaya, MALAYSIA
Mustafa, Nuzaimah Binti, Melaka, MALAYSIA
PATENT ASSIGNEE(S): Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20060141165 | A1 | 20060629 |
| | US 7527828 | B2 | 20090505 |
| APPLICATION INFO.: | US 2006-355325 | A1 | 20060216 (11) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2003-741413, filed on 19 Dec 2003, GRANTED, Pat. No. US 7037579 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |

S/N 10/589,366

LEGAL REPRESENTATIVE: Glen M. Diehl, NORTON & DIEHL LLC, Suite 110, 77 Brant Ave., Clark, NJ, 07066, US

NUMBER OF CLAIMS: 37

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 2 Drawing Page(s)

LINE COUNT: 595

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a method of making an elastomeric article including preparing a non-woven fibrous polymer composition for dip-coating onto a layer of carboxylated acrylonitrile-butadiene elastomeric surface and in particular making industrial or household gloves. By dipping a former into a salt-based coagulant, followed by dipping into an elastomeric dispersion, and finally dipping into a polymer composite fibrous coating, a useful elastomeric article is prepared. The invention also provides an elastomeric article having a first layer, the first layer comprising a natural or synthetic polymer; and a second layer bonded to the first layer, the second layer comprising a polymer composite fibrous coating. The polymer composite fibrous coating includes at least one elastomer or elastomer blend, a fiber or fiber blend, a surfactant, and a micronised wax. The coating can be foamed, and provides improved sweat management and non-shedding properties to a user.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 5 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2005:158028 USPATFULL

TITLE: Polymer composite fibrous coating on dipped rubber articles and method

INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA

Lucas, David Mark, Petaling Jaya, MALAYSIA

Mustafa, Nuzaimah Binti, Melaka, MALAYSIA

PATENT ASSIGNEE(S): Ansell Healthcare Products, Inc., Red Bank, NJ, UNITED STATES (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20050136236 | A1 | 20050623 |
| | US 7037579 | B2 | 20060502 |
| APPLICATION INFO.: | US 2003-741413 | A1 | 20031219 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | GARDNER CARTON & DOUGLAS LLP, ATTN: PATENT DOCKET DEPT., 191 N. WACKER DRIVE, SUITE 3700, CHICAGO, IL, 60606, US | | |
| NUMBER OF CLAIMS: | 40 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 2 Drawing Page(s) | | |
| LINE COUNT: | 630 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a method of making an elastomeric article including preparing a non-woven fibrous polymer composition for dip-coating onto a layer of carboxylated acrylonitrile-butadiene elastomeric surface and in particular making industrial or household gloves. By dipping a former into a salt-based coagulant, followed by dipping into an elastomeric dispersion, and finally dipping into a polymer composite fibrous coating, a useful elastomeric article is prepared. The invention also provides an elastomeric article having a first layer, the first layer comprising a natural or synthetic polymer; and a second layer bonded to the first layer, the second layer

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comprising a polymer composite fibrous coating. The polymer composite fibrous coating includes at least one elastomer or elastomer blend, a fiber or fiber blend, a surfactant, and a micronised wax. The coating can be foamed, and provides improved sweat management and non-shredding properties to a user.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 6 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2004:168052 USPATFULL
TITLE: Coating material and molded article
INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 6759473 | B1 | 20040706 |
| | WO 2001036553 | | 20010525 |
| APPLICATION INFO.: | US 2002-129956 | | 20020520 (10) |
| | WO 2000-JP8164 | | 20001120 |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 1999-327825 | 19991118 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Reddick, Judy M. | |
| LEGAL REPRESENTATIVE: | Armstrong, Kratz, Quintos, Hanson & Brooks, LLP | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1247 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB By coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 7 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2004:94457 USPATFULL
TITLE: Accelerator-free thin-walled rubber vulcanizates from latex
INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
Schmid, Eric, San Diego, CA, UNITED STATES
Watschke, Brian P., Eden Prairie, MN, UNITED STATES
PATENT ASSIGNEE(S): APEX MEDICAL TECHNOLOGIES, INC., a corporation of the state of Illinois, San Diego, CA (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20040071909 | A1 | 20040415 |
| | US 7374711 | B2 | 20080520 |
| APPLICATION INFO.: | US 2002-269840 | A1 | 20021010 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |

S/N 10/589,366

LEGAL REPRESENTATIVE: TOWNSEND AND TOWNSEND AND CREW, LLP, TWO EMBARCADERO CENTER, EIGHTH FLOOR, SAN FRANCISCO, CA, 94111-3834

NUMBER OF CLAIMS: 38

EXEMPLARY CLAIM: 1

LINE COUNT: 1228

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Thin-walled rubber articles for use contact with living tissue or with materials to be delivered to living tissue are prepared from aqueous latex of either natural rubber or synthetic cis-1,4-polyisoprene by vulcanization to produce both carbon-carbon and carbon-(sulfur).sub.n-carbon crosslinks, the vulcanization being performed in the absence of any compounding components that contain secondary amine groups or any components that have a tendency to produce nitrosamines. While sulfur activators may be included, it is preferable that no sulfur accelerators at all be included. Thin-walled rubber articles formed from the latex surprisingly exhibit a combination of high tensile strength, high ultimate percent elongation, and low 500% tensile modulus. The process is particularly effective in the manufacture of thin-walled articles from synthetic cis-1,4-polyisoprene.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 8 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2002:25127 USPATFULL

TITLE: Rubber glove and process for producing same

INVENTOR(S): Nakamura, Misao, Kawasaki-shi, JAPAN

Inoue, Toshihiro, Kawasaki-shi, JAPAN

PATENT ASSIGNEE(S): ZEON CORPORATION, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 20020013963 | A1 | 20020207 |
| | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | A1 | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | ARMSTRONG, WESTERMAN, HATTORI,, MCLELAND & NAUGHTON, LLP, 1725 K STREET, NW, SUITE 1000, WASHINGTON, DC, 20006 | |

NUMBER OF CLAIMS: 10

EXEMPLARY CLAIM: 1

LINE COUNT: 855

AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

S/N 10/589,366

L3 ANSWER 9 OF 13 USPAT2 on STN

ACCESSION NUMBER: 2006:203251 USPAT2
TITLE: Thin walled polynitrile oxide crosslinked rubber film products and methods of manufacture thereof
INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
Williams, Whitney A., Solana Beach, CA, UNITED STATES
Herrick, Scott W., San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): Regent Medical Limited, Manchester, UNITED KINGDOM
(non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 7294678 | B2 | 20071113 |
| APPLICATION INFO.: | US 2005-45938 | | 20050128 (11) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Rabago, Roberto | | |
| LEGAL REPRESENTATIVE: | Darby & Darby | | |
| NUMBER OF CLAIMS: | 9 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 1 Drawing Figure(s); 1 Drawing Page(s) | | |
| LINE COUNT: | 1599 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Natural rubber and/or synthetic polyisoprene film products having enhanced tear strength and tensile strength crosslinked with a one polynitrile oxide, intended for direct or indirect contact with living tissue or fluids to be placed in living organisms.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 10 OF 13 USPAT2 on STN

ACCESSION NUMBER: 2006:166660 USPAT2
TITLE: Polymer composite fibrous coating on dipped rubber articles and method
INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA
Lucas, David Mark, Petaling Jaya, MALAYSIA
Mustafa, Nuzaimah Binti, Melaka, MALAYSIA
PATENT ASSIGNEE(S): Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 7527828 | B2 | 20090505 |
| APPLICATION INFO.: | US 2006-355325 | | 20060216 (11) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2003-741413, filed on 19 Dec 2003, Pat. No. US 7037579 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Tran, Thao T. | | |
| LEGAL REPRESENTATIVE: | Diehl Servilla LLC | | |
| NUMBER OF CLAIMS: | 37 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 4 Drawing Figure(s); 2 Drawing Page(s) | | |
| LINE COUNT: | 603 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a method of making an elastomeric article including preparing a non-woven fibrous polymer composition for dip-coating onto a layer of carboxylated acrylonitrile-butadiene

elastomeric surface and in particular making industrial or household gloves. By dipping a former into a salt-based coagulant, followed by dipping into an elastomeric dispersion, and finally dipping into a polymer composite fibrous coating, a useful elastomeric article is prepared. The invention also provides an elastomeric article having a first layer, the first layer comprising a natural or synthetic polymer; and a second layer bonded to the first layer, the second layer comprising a polymer composite fibrous coating. The polymer composite fibrous coating includes at least one elastomer or elastomer blend, a fiber or fiber blend, a surfactant, and a micronised wax. The coating can be foamed, and provides improved sweat management and non-shedding properties to a user.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 11 OF 13 USPAT2 on STN

ACCESSION NUMBER: 2005:158028 USPAT2

TITLE: Polymer composite fibrous coating on dipped rubber articles and method

INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA

Lucas, David Mark, Petaling Jaya, MALAYSIA

Mustafa, Nuzaimah Binti, Melaka, MALAYSIA

PATENT ASSIGNEE(S): Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 7037579 | B2 | 20060502 |
| APPLICATION INFO.: | US 2003-741413 | | 20031219 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Bissett, Melanie | | |
| LEGAL REPRESENTATIVE: | Diehl, Glen M., Diehl Servilla LLC | | |
| NUMBER OF CLAIMS: | 10 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 4 Drawing Figure(s); 2 Drawing Page(s) | | |
| LINE COUNT: | 544 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a method of making an elastomeric article including preparing a non-woven fibrous polymer composition for dip-coating onto a layer of carboxylated acrylonitrile-butadiene elastomeric surface and in particular making industrial or household gloves. By dipping a former into a salt-based coagulant, followed by dipping into an elastomeric dispersion, and finally dipping into a polymer composite fibrous coating, a useful elastomeric article is prepared. The invention also provides an elastomeric article having a first layer, the first layer comprising a natural or synthetic polymer; and a second layer bonded to the first layer, the second layer comprising a polymer composite fibrous coating. The polymer composite fibrous coating includes at least one elastomer or elastomer blend, a fiber or fiber blend, a surfactant, and a micronised wax. The coating can be foamed, and provides improved sweat management and non-shredding properties to a user.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 12 OF 13 USPAT2 on STN

ACCESSION NUMBER: 2004:94457 USPAT2

TITLE: Accelerator-free thin-walled rubber vulcanizates from latex

INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
 Schmid, Eric, San Diego, CA, UNITED STATES
 Watschke, Brian P., Eden Prairie, MN, UNITED STATES
 PATENT ASSIGNEE(S): Apex Medical Technologies, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|------------------------------------|------|---------------|
| PATENT INFORMATION: | US 7374711 | B2 | 20080520 |
| APPLICATION INFO.: | US 2002-269840 | | 20021010 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Vargot, Mathieu D. | | |
| LEGAL REPRESENTATIVE: | Townsend and Townsend and Crew LLP | | |
| NUMBER OF CLAIMS: | 34 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 1205 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Thin-walled rubber articles for use contact with living tissue or with materials to be delivered to living tissue are prepared from aqueous latex of either natural rubber or synthetic cis-1,4-polyisoprene by vulcanization to produce both carbon-carbon and carbon-(sulfur).sub.n-carbon crosslinks, the vulcanization being performed in the absence of any compounding components that contain secondary amine groups or any components that have a tendency to produce nitrosamines. While sulfur activators may be included, it is preferable that no sulfur accelerators at all be included. Thin-walled rubber articles formed from the latex surprisingly exhibit a combination of high tensile strength, high ultimate percent elongation, and low 500% tensile modulus. The process is particularly effective in the manufacture of thin-walled articles from synthetic cis-1,4-polyisoprene.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L3 ANSWER 13 OF 13 USPAT2 on STN
 ACCESSION NUMBER: 2002:25127 USPAT2
 TITLE: Rubber glove and process for producing same
 INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
 Inoue, Toshihiro, Kawasaki, JAPAN
 PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Calvert, John J. | |
| ASSISTANT EXAMINER: | Muromoto, Robert H. | |
| LEGAL REPRESENTATIVE: | Armstrong, Westerman, Hattori, McLeland & Naughton, LLP | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 815 | |

AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is

disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

=> d 13 11 ibib hit

L3 ANSWER 11 OF 13 USPAT2 on STN

ACCESSION NUMBER: 2005:158028 USPAT2
 TITLE: Polymer composite fibrous coating on dipped rubber articles and method
 INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA
 Lucas, David Mark, Petaling Jaya, MALAYSIA
 Mustafa, Nuzaimah Binti, Melaka, MALAYSIA
 PATENT ASSIGNEE(S): Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 7037579 | B2 | 20060502 |
| APPLICATION INFO.: | US 2003-741413 | | 20031219 (10) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Bissett, Melanie | | |
| LEGAL REPRESENTATIVE: | Diehl, Glen M., Diehl Servilla LLC | | |
| NUMBER OF CLAIMS: | 10 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 4 Drawing Figure(s); 2 Drawing Page(s) | | |
| LINE COUNT: | 544 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

SUMM U.S. Pat. No. 6,143,416 discloses a method of forming a thin-walled article, namely a surgical glove. The glove includes a first elastomer layer of polyurethane formed by dip-coating using a rough-surfaced former to provide outer surface grip for the glove.

DETD Alternatively, in another embodiment, the composite mixture of fibrous materials and natural or synthetic polymers can also be foamed-up with suitable foaming agents or foam surfactants to give an open-celled fibrous foam construction laminate on the glove surface. Useful polymers include natural rubber latex, synthetic polyisoprene latex, styrene-butadiene latex, carboxylated or non-carboxylated acrylonitrile-butadiene latex, polychloroprene latex, polyacrylic latex, butyl latex, polyurethane latex, and the like.

DETD Natural or synthetic polymers can be used in the first, base layer of the elastomeric article of the present invention. The polymers include elastomers, such as, but not limited to, natural rubber, synthetic polyisoprene, styrene-butadiene, carboxylated or non-carboxylated acrylonitrile-butadiene, polychloroprene, polyacrylic, butyl rubber, or

polyurethane, and the like. The polyurethanes can be polyether- or polyester-based. Commercial elastomer latexes can be used that provide the polymer on curing. Useful commercial elastomer latexes include NEOREZ R-987, PERBUNAN X1171, and the like.

DETD

| | |
|----------------------------|-------|
| Carboxylated nitrile latex | 82.5% |
| Sieved cotton flock | 10.0% |
| Rayon flock | 2.5% |
| Micronised HDPE wax | 0.8% |
| Sodium lauryl sulfate | 0.1% |
| CALSOFT L 60 | 1.0% |
| ACRYSOL G 111 thickener | 0.8% |
| Zinc oxide | 1.5% |
| Sulfur | 0.4% |
| ZDEC | 0.4% |

=> d 13 8 ibib hit

L3 ANSWER 8 OF 13 USPATFULL on STN

ACCESSION NUMBER: 2002:25127 USPATFULL
 TITLE: Rubber glove and process for producing same
 INVENTOR(S): Nakamura, Misao, Kawasaki-shi, JAPAN
 Inoue, Toshihiro, Kawasaki-shi, JAPAN
 PATENT ASSIGNEE(S): ZEON CORPORATION, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 20020013963 | A1 | 20020207 |
| | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | A1 | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | ARMSTRONG, WESTERMAN, HATTORI,, MCLELAND & NAUGHTON, LLP, 1725 K STREET, NW, SUITE 1000, WASHINGTON, DC, 20006 | |

NUMBER OF CLAIMS: 10
 EXEMPLARY CLAIM: 1
 LINE COUNT: 855

SUMM [0007] Another proposal has been made wherein a slippery inner layer comprising a lubricant and a binder is formed on the skin-contacting surface of a rubber glove. In contrast to the powdered rubber glove wherein a loose dusting powder is physically adsorbed on the inner surface thereof, a rubber glove having the inner slippery layer has a benefit such that the inner slippery layer is bonded to the inner surface of the glove by a binder and thus, the lubricant does not easily fall off. For example, a medical rubber glove has been proposed in U.S. Pat. No. 4,070,713, which has an inner lubricating layer formed from a latex of carboxylated styrene-butadiene rubber having dispersed therein starch. A rubber glove has been proposed in Japanese Unexamined Patent Publication (hereinafter abbreviated to "JP-A") No. H11-61527, which has an inner lubricating layer prepared from an aqueous dispersion comprising a synthetic rubber latex, which is incapable of being coagulated with a coagulant contained in a main rubber layer of the rubber glove, said rubber latex being

blended with an organic filler such as a crosslinkable polymethyl methacrylate. These proposals provide an improvement in the donning and putting-off properties, but, the improvement achieved is still not to the desired extent. Further, adhesion of the lubricant used, i.e., starch or an organic filler such as a crosslinked polymethyl methacrylate to an elastomer formed by drying of the rubber latex, is weak and thus, the lubricant tends to fall off.

- SUMM [0014] The method for forming the main rubber layer constituting the glove proper is not particularly limited, and the main rubber layer is formed from natural rubber latex, synthetic rubber latex, or a mixed rubber latex thereof by conventional dip-forming methods which include, for example, straight dipping, coagulation dipping and dry heat dipping.
- DETD [0098] 10 parts of sulfur, 15 parts of zinc oxide, 7 parts of titanium oxide, 0.3 part of potassium hydroxide, and 32 parts of water were mixed together to prepare a vulcanizer solution having a solid content of 50.2%. 7 parts by weight of the vulcanizer solution was mixed with 333 parts of dip forming NBR latex having a solid content of 30% to prepare a dip forming formulation having a solid content of 30.4%.
- DETD [0100] The coagulant-deposited glove form was dipped in the above-mentioned dip forming NBR latex formulation for 10 seconds, and then taken out. The dip forming formulation-applied glove form was dried at 60° C. for 5 minutes, and then dipped in warm water maintained at 50° C. for 5 minutes. Thereafter the glove form was taken out and dried at 60° C. for 5 minutes to give a glove form having an NBR layer.

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L3 ANSWER 6 OF 13 USPTATFULL on STN

ACCESSION NUMBER: 2004:168052 USPTATFULL
 TITLE: Coating material and molded article
 INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
 Inoue, Toshihiro, Kawasaki, JAPAN
 PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 6759473 | B1 | 20040706 |
| | WO 2001036553 | | 20010525 |
| APPLICATION INFO.: | US 2002-129956 | | 20020520 (10) |
| | WO 2000-JP8164 | | 20001120 |

| | NUMBER | DATE |
|--|--|----------|
| PRIORITY INFORMATION: | JP 1999-327825 | 19991118 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Reddick, Judy M. | |
| LEGAL REPRESENTATIVE: | Armstrong, Kratz, Quintos, Hanson & Brooks, LLP | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1247 | |
| CAS INDEXING IS AVAILABLE FOR THIS PATENT. | | |
| AB | By coating a dip-formed article with a coating agent | |

comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

SUMM This invention relates to a coating agent and a coated article. More particularly, it relates to a coating agent giving a coated article by coating a dip-formed article such as a glove with the coating agent, which coated article can be easily donned and put off, from which fine particles are not easily released and which has an enhanced anti-blocking property; and to a coated article made by coating a dip-formed article with the coating agent.

SUMM Dip-formed articles made from natural rubber latex or synthetic rubber latex are used, for example, as rubber gloves and finger cots. In general the skin-contacting inner surface of a rubber glove is sticky and not slippery, and the rubber glove cannot be easily donned and put off. To facilitate donning and putting off of the rubber glove, various methods have been proposed. For example, to enhance the anti-sticking property, a method of applying a dusting powder such as talc powder onto the inner surface of a glove, and a method of subjecting the inner surface of a glove to a chlorinating treatment to form protrusions on the inner surface. However, in the former method, the applied dusting powder is easily released upon donning and putting off the glove, and, when the glove is used in a medical field including surgery, the released dusting powder may contaminate an operated part and cause postoperative complications. In the latter method, the treating cost is high, the facilitation of donning and putting off cannot be enhanced to the desired extent, and the use of chlorine may cause environmental pollution.

SUMM Further, proposals of enhancing donning and putting-off properties of a glove have been made wherein an elastomer layer or a resin layer, which contains fine particles incorporated therein, is formed on the inner surface of a glove. For example, a medical rubber glove has been proposed in Japanese Examined Patent Publication No. S60-6655 (U.S. Pat. No. 4,070,713), which has an inner lubricating layer formed from a latex of carboxylated styrene-butadiene rubber having starch dispersed therein. A rubber glove has been proposed in Japanese Unexamined Patent Publication (hereinafter abbreviated to "JP-A") No. H11-61527, which has an inner lubricating resin layer formed from an aqueous dispersion comprising a synthetic rubber latex and an organic filler, which rubber latex is incapable of being coagulated with a coagulant contained in a main rubber layer of the rubber glove. These proposals provide an improvement in the donning and putting-off properties to some extent, but, the surfaces of fine particles as lubricant are partly covered with a rubber latex. Thus, the improvement in donning and putting-off properties achieved is still not to the desired extent, and the inner lubricating layer tends to stick to each other and the sticking parts are difficult to separate.

SUMM In view of the foregoing prior art, a primary object of the present invention is to provide a dip-formed article such as, for example, a rubber glove, which can easily be donned and put off, and wherein fine particles and an elastomer ingredient not released, or are released only to a very slight extent, when the glove is donned or put off, or during wearing, and the inner elastomer coating layer exhibits an enhanced anti-blocking property; and to provide a coating agent used for the dip-formed article.

- SUMM The present inventors made extensive research to achieve the above-mentioned object, and found that the aimed coated article is obtained by coating a dip-formed article with a coating agent comprising a polymer latex having incorporated there in a special dispersion stabilizer. Based on this finding, the present invention has been completed.
- SUMM In accordance with the present invention, there is further provided a coated article made by coating a dip-formed article with the above-mentioned coating agent.
- SUMM The polymer constituting the polymer latex usually has a glass transition temperature of -50 to 100° C. If the glass transition temperature is too low, an inner coating layer of the coated article becomes sticky, and the coated article cannot easily be donned and put off, and has poor anti-blocking property. In contrast, if the glass transition temperature is too high, when a coated article is drawn, fine cracks are liable to occur in an inner coating layer and the inner coating layer tends to be separated from a dip-formed article.
- SUMM As specific examples of the fine inorganic particles, there can be mentioned fine particles of silica, magnesium oxide and titanium dioxide. As specific examples of the fine organic particles, there can be mentioned fine particles of acrylic resins, urethane resins, polyamide resins, olefin resins, formaldehyde resins, vinyl chloride resins, vinylidene chloride resins, nylon resins, cellulosic resins, starch, and crosslinked products thereof. These fine particles may be used either alone or as a combination of at least two kinds thereof. Of these, fine organic particles are preferable in view of enhanced adhesion to the polymer latex. Acrylic resins and acryl-styrene resins are especially preferable. Preferable fine organic particles have a glass transition temperature such that the particles are capable of being semi-molten by heat generated at a step of producing a dip-formed article. Such glass transition temperature is preferably in the range of 40 to 110° C., more preferably 50 to 90° C.
- SUMM The coated article of the present invention is made by coating a dip-formed article with the above-mentioned coating agent. The amount of coating agent is not particularly limited, but is preferably in the range of 0.1 to 2 g/m.², more preferably 0.15 to 1.5 g/m.².
- SUMM As specific examples of the dip-formed article, there can be mentioned gloves, finger cots and observation balloons. These dip-formed articles are made usually by conventional direct dip-forming, cohesion dip-forming and heat-sensitive dip-forming methods. The material of dip-formed article is not particularly limited, and the dip-formed article can be made from natural rubber latex or synthetic rubber latex. As specific examples of the synthetic rubber latex, there can be mentioned styrene-butadiene copolymer latex, acrylonitrile-butadiene copolymer latex and carboxyl-modified acrylonitrile-butadiene copolymer latex.
- SUMM The method of coating a dip-formed article with the coating agent usually includes, for example, a method of dipping a dip-formed article in a bath of the coating agent, and

a method of applying the coating agent to a dip-formed article.

SUMM The coating of dip-formed article can be conducted at a step following a dip-forming in the course of making a coated article from raw material, or conducted on a finished and stored dip-formed article. In either case, an as-coated dip-formed article is dried to give a coated article. The coating of dip-formed article may be conducted either on one surface or both surfaces thereof, and either on the whole surface or a part of the surface thereof.

DETD 10 parts of sulfur, 15 parts of zinc oxide, 7 parts of titanium oxide, 0.3 part of potassium hydroxide, and 32 parts of water were mixed together to prepare a vulcanizer solution having a solid content of 50%. 7 parts by weight of the vulcanizer solution was mixed with 220 parts of dip-forming latex having a solid content of 45% to prepare a dip forming -formulation. The dip-forming latex was a carboxyl-modified acrylonitrile-butadiene copolymer latex prepared by emulsion-copolymerization of 5 parts of methacrylic acid, 28 parts of acrylonitrile and 67 parts of 1,3-butadiene.

DETD The coagulant-deposited glove form was dipped in the above-mentioned dip-forming latex formulation for 10 seconds, and then taken out. The dip-forming formulation-applied glove form was then dried at 60° C. for 5 minutes.

DETD Fine organic particles (A) in an amount shown in Table 1 were incorporated in each of the polymer latexes, and deionized water was added to the polymer latex mixture to obtain coating agents (b) to (h) having a total solid content of 5%, for coating a dip-formed article therewith.

DETD To the polymer latex, styrene/acrylic copolymer resin particles having a volume average particle diameter of 5 μ m and a glass transition temperature of 55° C. (styrene/butyl acrylate=55%/45%; hereinafter referred to as "fine organic particles (B)") were added in an amount shown in Table 1, and further deionized water was added to obtain a coating agent (1) having a total solid content of 5%, for coating a dip-formed article therewith.

DETD Deionized water was added to the polymer latex to obtain a coating agent (j) having a total solid content of 5%, for coating a dip-formed article therewith.

DETD To each of the polymer latexes, fine organic particles (A) in an amount shown in Table 1 were incorporated, and further deionized water was added to obtain coating agents (k) and (m) having a total solid content of 5%, for coating a dip-formed article therewith.

DETD According to the present invention, by coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

CLM What is claimed is:

5. A coated article made by coating a dip-formed article with the coating agent as claimed in claim 1.

CLM What is claimed is:

6. The coated article according to claim 5, wherein the dip-formed article is a glove.

CLM What is claimed is:

S/N 10/589,366

15. A process for producing a coated article comprising forming a dip-formed article and coating the dip-formed article with the coating agent as claimed in claim 1.

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(FILE 'HOME' ENTERED AT 13:51:49 ON 17 SEP 2009)
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SET PLURALS ON PERM

FILE 'USPATFULL, USPATOLD, USPAT2, CAPLUS, JAPIO' ENTERED AT 13:52:48 ON
17 SEP 2009

L1 316 S DIP(1A) (FORMED OR FORMING) AND ZINC(2A) OXIDE#
L2 3372 S CARBOXY?(4A) ((STYREN?(1A) (BUTADIEN? OR ISOPREN?)) (4A) (RUBBER#
L3 13 S L1 AND L2

=> s latex### and zinc(2a)oxide#
L4 17207 LATEX### AND ZINC(2A) OXIDE#

=> s l2 and l4
L5 217 L2 AND L4

=> s latex### and (sulfur or vulcani?)
L6 38243 LATEX### AND (SULFUR OR VULCANI?)

=> s l5 and l6
L7 151 L5 AND L6

=> s latex### and ph
L8 63719 LATEX### AND PH

=> s l7 and l8
L9 71 L7 AND L8

=> s (sulfur or vulcani?)(s)(zinc(1a)oxide#)
L10 20055 (SULFUR OR VULCANI?)(S)(ZINC(1A) OXIDE#)

=> s l9 and l10
L11 49 L9 AND L10

=> d l1 1-49 ibib abs

L1 ANSWER 1 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:253195 USPATFULL
TITLE: METHOD AND MATERIAL FOR PROCESSING IRON DISILICIDE FOR
PHOTOVOLTAIC APPLICATION
INVENTOR(S): LEE, HOWARAD W.H., Saratoga, CA, UNITED STATES
Mikulec, Frederic Victor, Redwood City, CA, UNITED STATES
Gao, Bing Shen, Los Altos, CA, UNITED STATES
Huang, Jinman, Fremont, CA, UNITED STATES
PATENT ASSIGNEE(S): Stion Corporation, San Jose, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090227065 | A1 | 20090910 |
| APPLICATION INFO.: | US 2008-210173 | A1 | 20080912 (12) |

| | NUMBER | DATE |
|-----------------------|--|---------------|
| | ----- | ----- |
| PRIORITY INFORMATION: | US 2007-976317P | 20070928 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | TOWNSEND AND TOWNSEND AND CREW, LLP, TWO EMBARCADERO CENTER, EIGHTH FLOOR, SAN FRANCISCO, CA, 94111-3834, US | |
| NUMBER OF CLAIMS: | 17 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 7 Drawing Page(s) | |
| LINE COUNT: | 411 | |

AB A method for providing a semiconductor material for photovoltaic devices, the method includes providing a sample of iron disilicide comprising approximately 90 percent or greater of a beta phase entity. The sample of iron disilicide is characterized by a substantially uniform first particle size ranging from about 1 micron to about 10 microns. The method includes combining the sample of iron disilicide and a binding material to form a mixture of material. The method includes providing a substrate member including a surface region and deposits the mixture of material overlying the surface region of the substrate. In a specific embodiment, the mixture of material is subjected to a post-deposition process such as a curing process to form a thickness of material comprising the sample of iron disilicide overlying the substrate member. In a specific embodiment, the thickness of material is characterized by a thickness of about the first particle size.

L1 ANSWER 2 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:240732 USPATFULL

TITLE: TRANSCUTANEOUS ANALYTE SENSOR

INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Masterson, Steve, Encinitas, CA, UNITED STATES
Dobbles, J. Michael, San Diego, CA, UNITED STATES
Mensingher, Michael Robert, San Diego, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Kamath, Apurv Ullas, San Diego, CA, UNITED STATES
Brauker, James, Cement City, MI, UNITED STATES

PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|-------|---------------|
| | ----- | ----- | ----- |
| PATENT INFORMATION: | US 20090216103 | A1 | 20090827 |
| APPLICATION INFO.: | US 2009-437436 | A1 | 20090507 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-157365, filed on 21 Jun 2005, PENDING | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| | ----- | ----- |
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 17 | |
| EXEMPLARY CLAIM: | 1 | |

S/N 10/589,366

NUMBER OF DRAWINGS: 30 Drawing Page(s)

LINE COUNT: 4569

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 3 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:214445 USPATFULL

TITLE: TRANSCUTANEOUS ANALYTE SENSOR

INVENTOR(S): Brauker, James H., Cement City, MI, UNITED STATES
Kamath, Apurv Ullas, San Diego, CA, UNITED STATES
Goode, Paul, Cherry Hill, NJ, UNITED STATES

PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090192724 | A1 | 20090730 |
| APPLICATION INFO.: | US 2009-364786 | A1 | 20090203 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2006-334876, filed on 18 Jan 2006, PENDING Continuation-in-part of Ser. No. US 2003-633367, filed on 1 Aug 2003, PENDING Continuation-in-part of Ser. No. US 2004-7920, filed on 8 Dec 2004, PENDING Continuation-in-part of Ser. No. US 2004-991966, filed on 17 Nov 2004, Pat. No. US 7519408 | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2003-528382P | 20031209 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2003-523840P | 20031119 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US

NUMBER OF CLAIMS: 52

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 37 Drawing Page(s)

LINE COUNT: 5797

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 4 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:209761 USPATFULL

TITLE: Polymer Bonded Fibrous Coating on Dipped Rubber Articles Skin Contacting External Surface

INVENTOR(S): Hassan, Noorman Bin Abu, Shah Alam, MALAYSIA
Lucas, David M., Petaling Jaya Selangor, MALAYSIA

S/N 10/589,366

PATENT ASSIGNEE(S): Mustafa, Nuzaimah Binti, Melaka, MALAYSIA
Ansell Healthcare Products LLC, Red Bank, NJ, UNITED STATES (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|--|--|------|---------------|
| PATENT INFORMATION: | US 20090188019 | A1 | 20090730 |
| APPLICATION INFO.: | US 2009-408336 | A1 | 20090320 (12) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 2003-741413, filed on 19 Dec 2003, Pat. No. US 7037579 Continuation-in-part of Ser. No. US 2006-355325, filed on 16 Feb 2006, Pat. No. US 7527828 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DIEHL SERVILLA LLC, 77 BRANT AVE, SUITE 210, CLARK, NJ, 07066, US | | |
| NUMBER OF CLAIMS: | 21 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 3 Drawing Page(s) | | |
| LINE COUNT: | 852 | | |
| CAS INDEXING IS AVAILABLE FOR THIS PATENT. | | | |

AB A latex glove article with a fibrous coating bonded to the skin-contacting surface. Long length soft moisture absorbing fibers are attached to latex layer of a glove with a thin layer of polymeric latex adhesive forming a fibrous lining. The long length fibers have a length ranging from 4 to 100 times the thickness of the polymeric latex adhesive layer and therefore extend or project from the polymeric latex adhesive coating. The fibers penetrate the polymeric latex adhesive layer at one end or both end of the fiber to a depth of about 60% to about 100% of the adhesive thickness, leaving a substantial portion of the fiber available for soft contact with skin and sweat absorption. Due to the substantial thickness of the fibrous lining, an air gap is created between skin and the impervious latex layer establishing continual evaporation of absorbed sweat and evaporative cooling.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 5 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:181898 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Kline, Daniel, Encinitas, CA, UNITED STATES
Masterson, Steve, Encinitas, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090163791 | A1 | 20090625 |
| APPLICATION INFO.: | US 2009-391148 | A1 | 20090223 (12) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2005-157746, filed on 21 Jun 2005, Pat. No. US 7494465 | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |

S/N 10/589,366

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 21
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 30 Drawing Page(s)
LINE COUNT: 4545

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for
measuring an analyte in a host. More particularly, the present invention
relates to systems and methods for transcutaneous measurement of glucose
in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 6 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:181897 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Thrower, James Patrick, Oakland, NJ, UNITED STATES
Kline, Daniel S., Encinitas, CA, UNITED STATES
Codd, Daniel Shawn, Escondido, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Masterson, Steve, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090163790 | A1 | 20090625 |
| APPLICATION INFO.: | US 2009-359207 | A1 | 20090123 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77715, filed on 10 Mar 2005, Pat. No. US 7497827 | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 21
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 23 Drawing Page(s)
LINE COUNT: 4041

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for
measuring an analyte in a host. More particularly, the present invention
relates to systems and methods for transcutaneous measurement of glucose
in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 7 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:174303 USPATFULL

S/N 10/589,366

TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Thrower, James Patrick, Oakland, NJ, UNITED STATES
Kline, Daniel S., Encinitas, CA, UNITED STATES
Codd, Daniel Shawn, Escondido, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Masterson, Steve, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090156919 | A1 | 20090618 |
| APPLICATION INFO.: | US 2009-393887 | A1 | 20090226 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77715, filed on 10 Mar 2005, Pat. No. US 7497827 | | |

| | NUMBER | DATE |
|--|---|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 21 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 23 Drawing Page(s) | |
| LINE COUNT: | 4041 | |
| CAS INDEXING IS AVAILABLE FOR THIS PATENT. | | |
| AB | The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host. | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 8 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:170053 USPATFULL
TITLE: Materials, Systems and Methods for Optoelectronic Devices
INVENTOR(S): Klem, Ethan Jacob Dukenfield, Toronto, CANADA
MacNeil, Dean Delehanty, Montreal, CANADA
Konstantatos, Gerasimos, Toronto, CANADA
Tang, Jiang, Toronto, CANADA
Brading, Michael Charles, Danville, CA, UNITED STATES
Tian, Hui, Cupertino, CA, UNITED STATES
Sargent, Edward Hartley, Toronto, CANADA

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090152664 | A1 | 20090618 |
| APPLICATION INFO.: | US 2008-106256 | A1 | 20080418 (12) |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2007-912581P | 20070418 (60) |

S/N 10/589,366

| | |
|-----------------|---------------|
| US 2007-958846P | 20070709 (60) |
| US 2007-970211P | 20070905 (60) |
| US 2008-26440P | 20080205 (61) |
| US 2008-26650P | 20080206 (61) |
| US 2008-28481P | 20080213 (61) |
| US 2008-46379P | 20080418 (61) |

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: COURTNEY STANIFORD & GREGORY LLP, P.O. BOX 9686, SAN JOSE, CA, 95157, US
NUMBER OF CLAIMS: 25
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 99 Drawing Page(s)
LINE COUNT: 13889

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A photodetector is described along with corresponding materials, systems, and methods. The photodetector comprises an integrated circuit and at least two optically sensitive layers. A first optically sensitive layer is over at least a portion of the integrated circuit, and a second optically sensitive layer is over the first optically sensitive layer. Each optically sensitive layer is interposed between two electrodes. The two electrodes include a respective first electrode and a respective second electrode. The integrated circuit selectively applies a bias to the electrodes and reads signals from the optically sensitive layers. The signal is related to the number of photons received by the respective optically sensitive layer.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 9 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:165667 USPATFULL
TITLE: FORMING METHOD OF CONTACT HOLE AND MANUFACTURING METHOD OF SEMICONDUCTOR DEVICE, LIQUID CRYSTAL DISPLAY DEVICE AND EL DISPLAY DEVICE
INVENTOR(S): FUJII, Gen, Atsugi, JAPAN
SHIROGUCHI, Hiroko, Atsugi, JAPAN
PATENT ASSIGNEE(S): SEMICONDUCTOR ENERGY LABORATORY CO., LTD., Atsugi-shi, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090148971 | A1 | 20090611 |
| APPLICATION INFO.: | US 2009-368318 | A1 | 20090210 (12) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2005-43451, filed on 27 Jan 2005, Pat. No. US 7510905 | | |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2004-22039 | 20040129 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | NIXON PEABODY, LLP, 401 9TH STREET, NW, SUITE 900, WASHINGTON, DC, 20004-2128, US | |
| NUMBER OF CLAIMS: | 18 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 26 Drawing Page(s) | |
| LINE COUNT: | 2586 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB When forming a contact hole by a conventional manufacturing step of a semiconductor device, a resist is required to be formed on almost entire

S/N 10/589,366

surface of a substrate so as to be applied on a film other than an area in which a contact hole is to be formed, leading to drastically reduced throughput. According to a forming method of a contact hole and a manufacturing method of a semiconductor device, an EL display device and a liquid crystal display device of the invention, an island shape organic film is selectively formed over a semiconductor layer, a conductive layer or an insulating layer, and an insulating film is formed around the island shape organic film to form a contact hole. Therefore, a conventional patterning using a resist is not required, and high throughput and low cost can be achieved.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 10 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:159563 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Thrower, James Patrick, Oakland, NJ, UNITED STATES
Kline, Daniel S., Encinitas, CA, UNITED STATES
Codd, Daniel Shawn, San Diego, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Masterson, Steve, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090143660 | A1 | 20090604 |
| APPLICATION INFO.: | US 2008-329496 | A1 | 20081205 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77715, filed on 10 Mar 2005, Pat. No. US 7497827 | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 9 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 23 Drawing Page(s) | |
| LINE COUNT: | 3989 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 11 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:138532 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Kline, Daniel, Encinitas, CA, UNITED STATES

S/N 10/589,366

PATENT ASSIGNEE(S): Masterson, Steve, Encinitas, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090124879 | A1 | 20090514 |
| APPLICATION INFO.: | US 2009-353870 | A1 | 20090114 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-157746, filed on 21 Jun 2005, Pat. No. US 7494465 | | |

| | NUMBER | DATE |
|-----------------------|--|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 21 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 30 Drawing Page(s) | |
| LINE COUNT: | 4548 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 12 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:129820 USPATFULL
TITLE: ELECTROPHOTOGRAPHIC PHOTORECEPTOR AND METHOD FOR IMAGE
FORMATION USING SAID ELECTROPHOTOGRAPHIC PHOTORECEPTOR
INVENTOR(S): Kurihara, Shunichiro, Kanagawa, JAPAN
PATENT ASSIGNEE(S): Mitsubishi Chemical Corporation, Minato-ku, JAPAN
(non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|------------------|------|-----------------------|
| PATENT INFORMATION: | US 20090116874 | A1 | 20090507 |
| APPLICATION INFO.: | US 2006-915470 | A1 | 20060524 (11) |
| | WO 2006-JP310374 | | 20060524 |
| | | | 20080509 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2005-150503 | 20050524 |
| | JP 2005-151841 | 20050525 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C., 1940 DUKE STREET, ALEXANDRIA, VA, 22314, US | |
| NUMBER OF CLAIMS: | 8 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 1 Drawing Page(s) | |

S/N 10/589,366

LINE COUNT: 2294

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An image-forming method employing an electrophotographic process is provided with which images having high resolution can be obtained and which is less apt to cause image defects even in repetitions of use, does not cause conspicuous image defects even under severe conditions suitable for high resolution, and has excellent electrical characteristics. The object has been accomplished with an electrophotographic photoreceptor for developing an electrostatic latent image formed in the surface thereof with a polymerization toner, the electrophotographic photoreceptor comprising a photosensitive layer which contains a polymer comprising a repeating unit including a partial structure represented by formula (1).

##STR1##

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 13 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2009:116918 USPATFULL

TITLE: DIP Forming Latex Composition and
DIP Formed Article

INVENTOR(S): Kodama, Kazumi, Kotoku-Tokyo, JAPAN
Kato, Shinji, Kanagawa, JAPAN

PATENT ASSIGNEE(S): ZEON CORPORATION, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|------------------|------|-----------------------|
| PATENT INFORMATION: | US 20090105424 | A1 | 20090423 |
| APPLICATION INFO.: | US 2006-920635 | A1 | 20060518 (11) |
| | WO 2006-JP309940 | | 20060518 |
| | | | 20071119 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2005-148549 | 20050520 |
| | JP 2005-148552 | 20050520 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS CHURCH, VA, 22040-0747, US | |
| NUMBER OF CLAIMS: | 13 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 1221 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-forming latex composition comprising a conjugated diene rubber latex and an organic peroxide, wherein the residual effective activity of organic peroxide defined as the ratio of organic peroxide retaining reactivity to the whole organic peroxide contained in the latex composition is 35% or higher. The invention provides a dip-formed article, which exhibits good softness of touch and comfortable fittingness and excellent in tensile strength and resistance to flexing fatigue; which itself hardly suffers coloration especially when the article thereof is worn as a glove for continuous operation for a long time and is hard to reduce adhesiveness and following characteristics to hand while wearing it; and a dip-forming latex composition capable to give such an article by dip-forming thereof.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

S/N 10/589,366

L1 ANSWER 14 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:110149 USPATFULL
TITLE: DUAL ELECTRODE SYSTEM FOR A CONTINUOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Petisce, James R., San Diego, CA, UNITED STATES
Simpson, Peter, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090099436 | A1 | 20090416 |
| APPLICATION INFO.: | US 2008-335403 | A1 | 20081215 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2006-543539, filed on 4 Oct 2006, Pat. No. US 7467003 Continuation-in-part of Ser. No. US 2004-4561, filed on 3 Dec 2004, PENDING | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2003-527323P | 20031205 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 16 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 21 Drawing Page(s) | |
| LINE COUNT: | 5618 | |

AB Disclosed herein are systems and methods for a continuous analyte sensor, such as a continuous glucose sensor. One such system utilizes first and second working electrodes to measure additional analyte or non-analyte related signal. Such measurements may provide a background and/or sensitivity measurement(s) for use in processing sensor data and may be used to trigger events such as digital filtering of data or suspending display of data.

L1 ANSWER 15 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:84013 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Kamath, Apurv Ullas, San Diego, CA, UNITED STATES
Brauker, James, Cement City, MI, UNITED STATES
Dobbles, J. Michael, San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090076361 | A1 | 20090319 |
| APPLICATION INFO.: | US 2008-273359 | A1 | 20081118 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77765, filed on 10 Mar 2005, PENDING | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |

S/N 10/589,366

US 2004-614683P 20040930 (60)
US 2004-614764P 20040930 (60)
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 20
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 23 Drawing Page(s)
LINE COUNT: 4035
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The present invention relates generally to systems and methods for
measuring an analyte in a host. More particularly, the present invention
relates to systems and methods for transcutaneous measurement of glucose
in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 16 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:84012 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Pryor, Jack, San Diego, CA, UNITED STATES
Petisce, James R., San Diego, CA, UNITED STATES
Nolting, John, Poway, CA, UNITED STATES
Leach, Jacob S., Carlsbad, CA, UNITED STATES
Pestana, Luis, San Diego, CA, UNITED STATES
Quintana, Nelson, San Diego, CA, UNITED STATES
Swanson, Vance, San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090076360 | A1 | 20090319 |
| APPLICATION INFO.: | US 2007-855101 | A1 | 20070913 (11) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | | |
| NUMBER OF CLAIMS: | 59 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 33 Drawing Page(s) | | |
| LINE COUNT: | 5471 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The present invention relates generally to systems and methods for
measuring an analyte in a host. More particularly, the present invention
relates to systems and methods for transcutaneous measurement of glucose
in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 17 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:84008 USPATFULL
TITLE: DUAL ELECTRODE SYSTEM FOR A CONTINUOUS ANALYTE SENSOR
INVENTOR(S): Simpson, Peter C., Encinitas, CA, UNITED STATES
Brauker, James H., Cement City, MI, UNITED STATES
Goode, Paul V., Cherry Hill, NJ, UNITED STATES
Kamath, Apurv U., San Diego, CA, UNITED STATES
Petisce, James R., San Diego, CA, UNITED STATES

Woo, Kum Ming, San Diego, CA, UNITED STATES
 Nicholas, Melissa A., Monterey, CA, UNITED STATES
 Boock, Robert J., San Diego, CA, UNITED STATES
 Rixman, Monica A., San Diego, CA, UNITED STATES
 Burd, John, San Diego, CA, UNITED STATES
 Rhodes, Rathburn K., Madison, WI, UNITED STATES
 Tapsak, Mark A., Orangeville, PA, UNITED STATES
 DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
 corporation)

PATENT ASSIGNEE(S):

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090076356 | A1 | 20090319 |
| APPLICATION INFO.: | US 2008-264160 | A1 | 20081103 (12) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2007-692154, filed on 27 Mar 2007, PENDING Continuation-in-part of Ser. No. US 2006-543707, filed on 4 Oct 2006, Pat. No. US 7460898 Continuation-in-part of Ser. No. US 2004-4561, filed on 3 Dec 2004, PENDING Continuation-in-part of Ser. No. US 2006-543539, filed on 4 Oct 2006, Pat. No. US 7467003 Continuation-in-part of Ser. No. US 2004-4561, filed on 3 Dec 2004, PENDING Continuation-in-part of Ser. No. US 2006-543683, filed on 4 Oct 2006, Pat. No. US 7366556 Continuation-in-part of Ser. No. US 2004-4561, filed on 3 Dec 2004, PENDING Continuation-in-part of Ser. No. US 2006-543734, filed on 4 Oct 2006, Pat. No. US 7424318 Continuation-in-part of Ser. No. US 2004-4561, filed on 3 Dec 2004, PENDING Continuation-in-part of Ser. No. US 2007-675063, filed on 14 Feb 2007, PENDING Continuation-in-part of Ser. No. US 2006-503367, filed on 10 Aug 2006, PENDING Continuation-in-part of Ser. No. US 2006-439630, filed on 23 May 2006, PENDING Continuation-in-part of Ser. No. US 2005-77715, filed on 10 Mar 2005, PENDING Continuation-in-part of Ser. No. US 2006-404417, filed on 14 Apr 2006, PENDING Continuation-in-part of Ser. No. US 2004-896639, filed on 21 Jul 2004, Pat. No. US 7379765 Continuation-in-part of Ser. No. US 2004-991353, filed on 16 Nov 2004, PENDING Continuation-in-part of Ser. No. US 2007-654140, filed on 17 Jan 2007, PENDING Continuation-in-part of Ser. No. US 2006-335879, filed on 18 Jan 2006, PENDING Continuation-in-part of Ser. No. US 2007-654327, filed on 17 Jan 2007, ABANDONED Continuation-in-part of Ser. No. US 2006-335879, filed on 18 Jan 2006, PENDING | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2003-527323P | 20031205 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2003-527323P | 20031205 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2003-527323P | 20031205 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2003-527323P | 20031205 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |

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| | |
|-----------------|---------------|
| US 2005-683923P | 20050523 (60) |
| US 2004-587787P | 20040713 (60) |
| US 2004-587800P | 20040713 (60) |
| US 2004-614683P | 20040930 (60) |
| US 2004-614764P | 20040930 (60) |
| US 2003-490009P | 20030725 (60) |
| US 2003-523832P | 20031119 (60) |
| US 2004-587787P | 20040713 (60) |
| US 2004-614683P | 20040930 (60) |
| US 2005-669851P | 20050408 (60) |
| US 2005-669851P | 20050408 (60) |

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 11
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 24 Drawing Page(s)
LINE COUNT: 7073
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB Disclosed herein are systems and methods for a continuous analyte
sensor, such as a continuous glucose sensor. One such system utilizes
first and second working electrodes to measure analyte or non-analyte
related signal, both of which electrode include an interference domain.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 18 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:80442 USPATFULL
TITLE: Photovoltaic-Charged Secondary Battery System
INVENTOR(S): Lee, Joong Kee, Seoul, KOREA, REPUBLIC OF
Cho, Byung Won, Seoul, KOREA, REPUBLIC OF
Chung, Kyung Yoon, Seoul, KOREA, REPUBLIC OF
Kim, Hyung Sun, Seoul, KOREA, REPUBLIC OF
Kim, Il Doo, Seoul, KOREA, REPUBLIC OF
Jeon, Chan Wook, Seoul, KOREA, REPUBLIC OF
Kim, Yong Sang, Yongin-si, KOREA, REPUBLIC OF

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090072780 | A1 | 20090319 |
| APPLICATION INFO.: | US 2007-962273 | A1 | 20071221 (11) |

| | NUMBER | DATE |
|-----------------------|---------------|----------|
| PRIORITY INFORMATION: | KR 2007-92928 | 20070913 |

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: FROMMER LAWRENCE & HAUG, 745 FIFTH AVENUE- 10TH FL.,
NEW YORK, NY, 10151, US
NUMBER OF CLAIMS: 25
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 12 Drawing Page(s)
LINE COUNT: 1344
CAS INDEXING IS AVAILABLE FOR THIS PATENT.
AB The present invention provides a photovoltaic-charged secondary battery
system, in which an electrode for optical power generation and an
electrode for charging and discharging generated electrical energy are
integrated into a single cell structure, and the potential difference
between the electrodes is systematically controlled, thus maximizing the

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conversion efficiency of optical energy, maximizing the utilization rate of cell energy, and extending the life span of the battery.

For this, the present invention provides a photovoltaic-charged secondary battery system including: a transparent electrode capable of transmitting light; a PN semiconductor layer formed on the transparent electrode and generating a current by incident light; and a secondary battery layer, formed on the PN semiconductor layer, in which the current generated by the PN semiconductor layer is charged.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 19 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:79923 USPATFULL
TITLE: LIGHT-EMITTING DIODE APPARATUS AND MANUFACTURING METHOD THEREOF
INVENTOR(S): Chen, Shih-Peng, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Chan, Chia-Hua, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Wang, Horng-Jou, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Lin, Ching-Liang, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Chen, Chii-Chang, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Liu, Chen-Yi, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA
Chen, Huang-Kun, Taoyuan Hsien, TAIWAN, PROVINCE OF CHINA

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090072259 | A1 | 20090319 |
| APPLICATION INFO.: | US 2008-193271 | A1 | 20080818 (12) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | TW 2007-96134165 | 20070913 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | Muncy, Geissler, Olds & Lowe, PLLC, P.O. BOX 1364, FAIRFAX, VA, 22038-1364, US | |
| NUMBER OF CLAIMS: | 22 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 6 Drawing Page(s) | |
| LINE COUNT: | 374 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A light-emitting diode (LED) apparatus includes a thermoconductive substrate, a thermoconductive adhesive layer, an epitaxial layer, a current spreading layer and a micro- or nano-roughing structure. The thermoconductive adhesive layer is disposed on the thermoconductive substrate. The epitaxial layer is disposed opposite to the thermoconductive adhesive layer and has a first semiconductor layer, an active layer and a second semiconductor layer. The current spreading layer is disposed between the second semiconductor layer of the epitaxial layer and the thermoconductive adhesive layer. The micro- or nano-roughing structure is disposed on the first semiconductor layer of the epitaxial layer. In addition, a manufacturing method of the LED apparatus is also disclosed.

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CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 20 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:78586 USPATFULL
TITLE: PERSONAL PROTECTIVE GARMENT
INVENTOR(S): Kassam, Mikhail, Toronto, CANADA

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090070916 | A1 | 20090319 |
| APPLICATION INFO.: | US 2008-209902 | A1 | 20080912 (12) |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2007-972050P | 20070913 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | FITCH EVEN TABIN AND FLANNERY, 120 SOUTH LA SALLE STREET, SUITE 1600, CHICAGO, IL, 60603-3406, US | |
| NUMBER OF CLAIMS: | 18 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 2 Drawing Page(s) | |
| LINE COUNT: | 490 | |

AB A personal protective garment, preferably a glove, for protecting at least a portion of the body of a wearer is disclosed. The garment comprises a liner, an overlayer and at least one covering layer. The liner comprises a flexible material and is adapted to be worn on at least a portion of the body of the wearer. The overlayer comprises a milled polymer and is adapted to cover at least a portion of the liner and is secured to the liner. The covering layer comprises a polymer and is adhering to and covering at least a portion of the overlayer. The milled polymer is preferably milled rubber. Also disclosed is a method of making a personal protective garment, preferably a glove.

L1 ANSWER 21 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:67360 USPATFULL
TITLE: PROCESS FOR PRODUCING ELECTROPHOTOGRAPHIC ROLLER MEMBER
INVENTOR(S): Yamauchi, Kenichi, Susono-shi, JAPAN
Sato, Hidenori, Odawara-shi, JAPAN
Anan, Genya, Numazu-shi, JAPAN
PATENT ASSIGNEE(S): CANON KABUSHIKI KAISHA, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20090061109 | A1 | 20090305 |
| APPLICATION INFO.: | US 2008-260906 | A1 | 20081029 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. WO 2008-JP58305, filed on 23 Apr 2008, PENDING | | |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2007-118783 | 20070427 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | FITZPATRICK CELLA HARPER & SCINTO, 30 ROCKEFELLER PLAZA, NEW YORK, NY, 10112, US | |
| NUMBER OF CLAIMS: | 5 | |
| EXEMPLARY CLAIM: | 1 | |

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NUMBER OF DRAWINGS: 3 Drawing Page(s)

LINE COUNT: 1270

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A process for producing an electrophotographic roller member comprising a roller base member having a conductive mandrel and an elastic layer, and a film on the elastic layer. The process comprises the step of forming the film by plasma CVD. The step comprises the steps of: placing the roller base member in a chamber in such a way that the distance between the surface of the elastic layer and flat-plate electrodes is 20 mm or more to 100 mm or less; feeding a source gas into the chamber so as to have a pressure of from 13.3 Pa or more to 666.6 Pa or less; and applying to an electrode an electric power of from 0.3 W/cm.sup.2 or more to 2.0 W/cm.sup.2 or less while rotating the roller base member so that the peripheral speed of from 6 mm/s or more to 170 mm/s or less.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 22 OF 316 USPTATFULL on STN

ACCESSION NUMBER: 2009:52410 USPTATFULL

TITLE: ELECTROPHOTOGRAPHIC PHOTORECEPTOR

INVENTOR(S): TAJIMA, Hiroyuki, Yokohama-shi, JAPAN

Kumano, Yuuta, Yokohama-shi, JAPAN

PATENT ASSIGNEE(S): MITSUBISHI CHEMICAL CORPORATION, Minato-ku, JAPAN
(non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090047589 | A1 | 20090219 |
| APPLICATION INFO.: | US 2008-246188 | A1 | 20081006 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2007-572001, filed on 12 Jan 2007, PENDING A 371 of International Ser. No. WO 2005-JP13187, filed on 15 Jul 2005 | | |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2004-210571 | 20040716 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C., 1940 DUKE STREET, ALEXANDRIA, VA, 22314, US | |
| NUMBER OF CLAIMS: | 17 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 1 Drawing Page(s) | |
| LINE COUNT: | 2969 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Disclosed is an electrophotographic photoreceptor which is excellent in wear resistance and electrical characteristics. Specifically disclosed is an electrophotographic photoreceptor containing a polyester resin in a photosensitive layer provided on an electroconductive substrate. The polyester resin is composed of a copolymer represented by the general formula 1 below, which has a viscosity average molecular weight (Mv) of 10,000-300,000 and contains a diphenyl ether 4,4'-dicarboxylic acid component and a bivalent phenol component.

##STR1##

In the general formula 1, A represents a diphenyl ether 4,4'-dicarboxylic acid residue represented by the formula A below, and B represents a bivalent phenol residue represented by the formula B below.

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##STR2##

In the formula A, each of Ra.sup.1 and Ra.sup.2 independently represents a hydrogen atom or a monovalent substituent which may have a substituent, and each of n and m is independently an integer from 0 to 4. In the formula B, each of R.sup.1 and R.sup.2 independently represents one selected from the group consisting of a hydrogen atom, an alkyl group, an aryl group, a halogen group, and an alkoxy group.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 23 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:40112 USPATFULL
TITLE: ANALYTE SENSOR
INVENTOR(S): Brauker, James H., Cement City, MI, UNITED STATES
Simpson, Peter C., Encinitas, CA, UNITED STATES
Boock, Robert, San Diego, CA, UNITED STATES
Rixman, Monica, San Diego, CA, UNITED STATES
Brister, Mark, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20090036763 | A1 | 20090205 |
| APPLICATION INFO.: | US 2008-250918 | A1 | 20081014 (12) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2006-439630, filed on 23 May 2006, PENDING Continuation-in-part of Ser. No. US 2005-77715, filed on 10 Mar 2005, PENDING | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| | US 2005-683923P | 20050523 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 21 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 14 Drawing Page(s) | |
| LINE COUNT: | 3800 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to biointerface membranes utilized with implantable devices, such as devices for the detection of analyte concentrations in a biological sample. More particularly, the invention relates to novel biointerface membranes, to devices and implantable devices including these membranes, methods for forming the biointerface membranes on or around the implantable devices, and to methods for monitoring glucose levels in a biological fluid sample using an implantable analyte detection device.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 24 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:31724 USPATFULL
TITLE: STRUCTURE WITH CAPABILITY OF CONDUCTING/ABSORBING

INVENTOR(S): ELECTROMAGNETIC WAVES
Sano, Masanori, Osaka, JAPAN
Imono, Shozo, Osaka, JAPAN
Niino, Takuya, Osaka, JAPAN
PATENT ASSIGNEE(S): Nitto Denko Corporation, Ibaraki-shi, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|------------------|------|-----------------------|
| PATENT INFORMATION: | US 20090029094 | A1 | 20090129 |
| APPLICATION INFO.: | US 2006-886579 | A1 | 20060412 (11) |
| | WO 2006-JP307765 | | 20060412 |
| | | | 20070918 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2005-119225 | 20050418 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | EDWARDS ANGELL PALMER & DODGE LLP, P.O. BOX 55874, BOSTON, MA, 02205, US | |
| NUMBER OF CLAIMS: | 16 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 10 Drawing Page(s) | |
| LINE COUNT: | 3876 | |

AB Disclosed is a structure which can maintain a capability of conducting or absorbing electromagnetic waves even when an external pressure is applied thereon. The structure (1) includes a fibrous protrusion (1b) having the capability of conducting or absorbing electromagnetic waves partially arranged on a substrate (1a) so that at least a part of a fiber of the fibrous protrusion is positioned outward from a surface of the substrate (1a). The structure further includes a fiber protector (1c) arranged at least partially of a portion in a surface (1a1) of the substrate (1a) where no fibrous protrusion (1b) is arranged, in which the fiber protector is capable of suppressing or preventing the fibrous protrusion (1b) from flattening.

L1 ANSWER 25 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2009:31249 USPATFULL
TITLE: LUBRICANT COATER, IMAGE BEARING UNIT, AND IMAGE FORMING APPARATUS
INVENTOR(S): Kabata, Toshiyuki, Yokohama-shi, JAPAN
Hatakeyama, Kumiko, Sagamihara-shi, JAPAN
Yamashita, Masahide, Tokyo, JAPAN
PATENT ASSIGNEE(S): RICOH COMPANY, LTD, TOKYO, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20090028618 | A1 | 20090129 |
| APPLICATION INFO.: | US 2008-177475 | A1 | 20080722 (12) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2007-190407 | 20070723 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | COOPER & DUNHAM, LLP, 30 Rockefeller Plaza, 20th Floor, NEW YORK, NY, 10112, US | |
| NUMBER OF CLAIMS: | 6 | |

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EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 5 Drawing Page(s)
LINE COUNT: 3040
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides a lubricant coater including an applying member for applying a lubricant powder on a surface of an image bearing member, wherein the lubricant powder contains paraffin as a main component, and the lubricant coatability of the applying member is controlled such that a maximum thickness of a lubricant film formed on the image bearing member, which is obtained after the lubricant powder is continuously applied on the surface of the image bearing member for 120 minutes, is 0.25 μm or less.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 26 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:359172 USPATFULL
TITLE: Thin Film Transistor and Display Device, and Method for Manufacturing Thereof
INVENTOR(S): Fujii, Gen, Kanagawa, JAPAN
PATENT ASSIGNEE(S): Semiconductor Energy Laboratory Co., Ltd., Atsugi-shi, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|-----------------------|
| PATENT INFORMATION: | US 20080315428 | A1 | 20081225 |
| APPLICATION INFO.: | US 2005-586661 | A1 | 20050215 (10) |
| | WO 2005-JP2681 | | 20050215 |
| | | | 20060719 PCT 371 date |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2004-40499 | 20040217 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | NIXON PEABODY, LLP, 401 9TH STREET, NW, SUITE 900, WASHINGTON, DC, 20004-2128, US | |
| NUMBER OF CLAIMS: | 22 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 47 Drawing Page(s) | |
| LINE COUNT: | 3206 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention discloses a display device and a manufacturing method thereof by which a manufacturing process can be simplified. Further, the present invention discloses technique for manufacturing a pattern such as a wiring into a desired shape with good controllability. A method for forming a pattern for constituting the display device according to the present invention comprises the steps of forming a first region and a second region; discharging a composition containing a pattern formation material to a region across the second region and the first region; and flowing a part of the composition discharged to the first region into the second region; wherein wettability with respect to the composition of the first region is lower than that of the second composition.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 27 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:338663 USPATFULL
TITLE: Filter for a plasma display apparatus

S/N 10/589,366

INVENTOR(S): Hwang, Cha-Won, Suwon-si, KOREA, REPUBLIC OF

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080297023 | A1 | 20081204 |
| APPLICATION INFO.: | US 2008-155001 | A1 | 20080528 (12) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | KR 2007-52926 | 20070530 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | ROBERT E. BUSHNELL, 1522 K STREET NW, SUITE 300, WASHINGTON, DC, 20005-1202, US | |
| NUMBER OF CLAIMS: | 16 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 3 Drawing Page(s) | |
| LINE COUNT: | 401 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A filter that can prevent a double image and increase bright room contrast, has a reduced weight and low manufacturing cost, and is easy to manufacture, and a plasma display apparatus employing the filter. The filter includes a base film, a plurality of light absorbing pattern units that are extended on a surface of the base film in predetermined intervals having a stripe shape, blocking electromagnetic waves, and a reflection prevention layer covering the plurality of light absorbing pattern units.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 28 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:337796 USPATFULL
TITLE: LOW OXYGEN IN VIVO ANALYTE SENSOR
INVENTOR(S): Shults, Mark C., Madison, WI, UNITED STATES
Rhodes, Rathburn K., Madison, WI, UNITED STATES
Updike, Stuart J., Madison, WI, UNITED STATES
Brauker, James H., Cement City, MI, UNITED STATES
PATENT ASSIGNEE(S): DEXCOM, INC., SAN DIEGO, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080296155 | A1 | 20081204 |
| APPLICATION INFO.: | US 2008-113724 | A1 | 20080501 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2006-333837, filed on 17 Jan 2006, PENDING Continuation-in-part of Ser. No. US 2005-77714, filed on 10 Mar 2005, PENDING Continuation-in-part of Ser. No. US 2004-838909, filed on 3 May 2004, PENDING Continuation-in-part of Ser. No. US 1999-447227, filed on 22 Nov 1999, PENDING Division of Ser. No. US 1997-811473, filed on 4 Mar 1997, Pat. No. US 6001067 | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| DOCUMENT TYPE: | Utility | |

S/N 10/589,366

FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 14
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 34 Drawing Page(s)
LINE COUNT: 4986

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous and subcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 29 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:337529 USPATFULL
TITLE: ZNO WHISKER FILMS AND METHOD OF MANUFACTURING SAME
INVENTOR(S): HU, Xiulan, Aichi, JAPAN
Masuda, Yoshitake, Aichi, JAPAN
Kato, Kazumi, Aichi, JAPAN
PATENT ASSIGNEE(S): National Institute of Adv. Industrial Sci. and Tech,
Chiyoda-ku, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080295886 | A1 | 20081204 |
| APPLICATION INFO.: | US 2008-129099 | A1 | 20080529 (12) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2007-146232 | 20070531 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C., 1940 DUKE STREET, ALEXANDRIA, VA, 22314, US | |
| NUMBER OF CLAIMS: | 12 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 5 Drawing Page(s) | |
| LINE COUNT: | 570 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention is a ZnO whisker film, a manufacturing method thereof and an electronic device material composed of such a ZnO whisker film, the film is composed of primarily (at least 50 mol %) of ZnO crystals, and of accumulated whisker-like particles having an aspect ratio of 2 or more, and the film has a nanostructure with both a high specific surface area and a high electrical conductivity, the film can be manufactured by adjusting one or more solution condition selected from starting material concentration, temperature and pH so as to induce the deposition of ZnO crystals, in a reaction solution system for depositing zinc oxide, and forming thereby a ZnO whisker film on a substrate.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 30 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:323301 USPATFULL
TITLE: ARTICLE INCLUDING SHEET-LIKE ELECTROMAGNETIC SHIELDING
STRUCTURE
INVENTOR(S): NIINO, Takuya, Osaka, JAPAN

S/N 10/589,366

PATENT ASSIGNEE(S): IMONO, Shozo, Osaka, JAPAN
SANO, Masanori, Osaka, JAPAN
NITTO DENKO CORPORATION, Osaka, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080283290 | A1 | 20081120 |
| APPLICATION INFO.: | US 2007-741934 | A1 | 20070430 (11) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2006-126182 | 20060428 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | SUGHRUE-265550, 2100 PENNSYLVANIA AVE. NW, WASHINGTON, DC, 20037-3213, US | |
| NUMBER OF CLAIMS: | 16 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 10 Drawing Page(s) | |
| LINE COUNT: | 4559 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates to an article to which a characteristic of shielding electromagnetic waves is imparted, which comprises at least a sheet-like electromagnetic shielding structure, the sheet-like electromagnetic shielding structure comprising a thin layer-like substrate; and a fiber convex structure section having a characteristic of conducting or absorbing electromagnetic waves, in which the said fiber convex structure section is formed at least partially on the thin layer-like substrate in such a form that at least a part of a fiber thereof is positioned outward from the surface of the thin layer-like substrate. As the article including the sheet-like electromagnetic shielding structure, an electronic device, an electronic circuit board, garment, an architectural structure, a construction material, or a transport equipped with an engine is suitable.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 31 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:313662 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Thrower, James Patrick, San Diego, CA, UNITED STATES
McGee, Thomas F., San Diego, CA, UNITED STATES
Codd, Daniel Shawn, Escondido, CA, UNITED STATES
Petersen, David Michael, Escondido, CA, UNITED STATES
Kline, Daniel S., Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080275313 | A1 | 20081106 |
| APPLICATION INFO.: | US 2008-175391 | A1 | 20080717 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77643, filed on 10 Mar 2005, PENDING | | |

| NUMBER | DATE |
|--------|------|
|--------|------|

S/N 10/589,366

| | ----- | ----- |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US

NUMBER OF CLAIMS: 17

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 23 Drawing Page(s)

LINE COUNT: 4060

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 32 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2008:291280 USPATFULL

TITLE: Dip-forming latex, dip-forming composition and dip-formed article

INVENTOR(S): Ota, Hisanori, Tokyo, JAPAN
Aihara, Shunjin, Tokyo, JAPAN
Kodama, Kazumi, Tokyo, JAPAN

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080255314 | A1 | 20081016 |
| APPLICATION INFO.: | US 2007-882742 | A1 | 20070803 (11) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2004-505734, filed on 26 Aug 2004, Pat. No. US 7273906 | | |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 2002-53491 | 20020228 |
| | JP 2002-75326 | 20020319 |
| | JP 2002-142621 | 20020517 |

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: BIRCH STEWART KOLASCH & BIRCH, PO BOX 747, FALLS
CHURCH, VA, 22040-0747, US

NUMBER OF CLAIMS: 21

EXEMPLARY CLAIM: 1

LINE COUNT: 1125

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A dip-forming latex obtained by copolymerization of (a) 50-89.5 weight parts of a conjugated diene monomer, (b) 10-40 weight parts of an ethylenically unsaturated nitrile monomer, (c) 0.5-10 weight parts of an ethylenically unsaturated acid monomer and (d) 0-20 weight parts of other copolymerizable ethylenically unsaturated monomer (the total of these monomers is 100 weight parts), wherein the copolymerization is initiated with a monomer mixture comprising at least 80 weight % of (a), at least 50 weight % of (b), 10-90 weight % of (c) and least 80 weight % of (d), and thereafter, the remainders of monomers are added to

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a polymerization system to continue copolymerization. This latex gives a dip-formed article exhibiting good softness of touch, high tensile strength and good retention of close fittingness.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 33 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:277348 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Simpson, Peter C., Encinitas, CA, UNITED STATES
Brauker, James H., Cement City, MI, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080242961 | A1 | 20081002 |
| APPLICATION INFO.: | US 2008-137396 | A1 | 20080611 (12) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2005-158227, filed on 21 Jun 2005, PENDING | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 6 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 30 Drawing Page(s) | |
| LINE COUNT: | 4488 | |

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

L1 ANSWER 34 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:276108 USPATFULL
TITLE: IMAGE FORMING APPARATUS, IMAGE FORMING METHOD AND PROCESS CARTRIDGE
INVENTOR(S): Ishikawa, Masahiko, Fuji-shi, JAPAN
Tomita, Masami, Numazu-shi, JAPAN
Kawasaki, Yoshiaki, Susono-shi, JAPAN

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080241716 | A1 | 20081002 |
| APPLICATION INFO.: | US 2007-943713 | A1 | 20071121 (11) |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 2006-314898 | 20061121 |
| | JP 2007-175832 | 20070704 |
| DOCUMENT TYPE: | Utility | |

S/N 10/589,366

FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C., 1940
DUKE STREET, ALEXANDRIA, VA, 22314, US
NUMBER OF CLAIMS: 12
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 6 Drawing Page(s)
LINE COUNT: 4040

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An image forming apparatus including an image bearing member, a charging device, an irradiating device, a developing device, a transfer device, a fixing device, and a cleaning device, wherein the image bearing member includes a substrate on which a photosensitive layer and a cross-linked surface layer are accumulated and the cross-linked surface layer comprises a cross-linked material formed by curing a monomer having at least three radical polymerizable function groups without a charge transport structure and a radical polymerizable compound having a charge transport structure by a photo-energy irradiation device, wherein the toner has a volume average particle diameter of from 1 to 5 μm and an average circularity of from 0.95 to 0.98, wherein external additives added to the toner satisfy the following relationship: $1 < 3X/5 + Y < 3$, wherein X represents the amount of an external additive having a primary particle diameter of from 10 to 20 nm and Y represents the amount of another external additive having a primary particle diameter of from 100 to 200 nm and X and Y satisfy the following relationship: $X < Y$, $0 < X \leq 1$ and $1 \leq Y$, and wherein the cleaning device includes a cleaning blade made of a polyurethane rubber plate having a hardness of from 70 to 80°, and a rebound resilience of from 10 to 35% at 25° C.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 35 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:261273 USPATFULL
TITLE: THIN WALLED POLYNITRILE OXIDE CROSSLINKED RUBBER FILM
PRODUCTS AND METHODS OF MANUFACTURE THEREOF
INVENTOR(S): McGlothlin, Mark W., San Diego, CA, UNITED STATES
Ginter, Whitney Williams, Solana Beach, CA, UNITED STATES
Herrick, Scott W., San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): Apex Medical Technologies, Inc. (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080227921 | A1 | 20080918 |
| APPLICATION INFO.: | US 2007-870998 | A1 | 20071011 (11) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2005-45938, filed on 28 Jan 2005, Pat. No. US 7294678 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | DARBY & DARBY P.C., P.O. BOX 770, Church Street Station, New York, NY, 10008-0770, US | | |
| NUMBER OF CLAIMS: | 18 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 1 Drawing Page(s) | | |
| LINE COUNT: | 1598 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Natural rubber and/or synthetic polyisoprene film products having enhanced tear strength and tensile strength crosslinked with a one polynitrile oxide, intended for direct or indirect contact with living tissue or fluids to be placed in living organisms.

S/N 10/589,366

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 36 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:261266 USPATFULL
TITLE: LATEX COMPOSITION COMPRISING A CROSS-LINKING AGENT AND
MOLDED PRODUCT THEREOF
INVENTOR(S): KOIDE, Kazuo, Yotsukaido-shi, JAPAN
PATENT ASSIGNEE(S): FOUR ROAD RESEARCH LTD., Yotsukaido-shi, JAPAN
(non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080227913 | A1 | 20080918 |
| APPLICATION INFO.: | US 2007-965629 | A1 | 20071227 (11) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. WO 2007-JP62791, filed on 26 Jun 2007, PENDING | | |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2006-180764 | 20060630 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 13 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 2788 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A carboxyl group-containing diene-based rubber latex composition
comprising (a) a carboxyl group-containing diene-based rubber latex and
one or more compounds selected from the following (b) to (e):

(b) an organometallic crosslinking agent containing two or more hydroxyl
groups each bonded to a metal atom; (c) a cationic
property-deactivated, modified polyamine-based resin, a cationic
property-deactivated polyamide-epichlorohydrin resin, a cationic
property-deactivated polyamine-epichlorohydrin resin, a cationic
property-deactivated amine group- or quaternary ammonium base-containing
polyvinyl alcohol, a cationic property-deactivated amine group- or
quaternary ammonium base-containing polyacrylamide, a cationic
property-deactivated amine group- or quaternary ammonium base-containing
carbohydrate, or a polyacrylamide, polyvinyl alcohol, or carbohydrate
into which a crosslinkable functional group is introduced; (d) an
anionic or nonionic polyvinyl alcohol, anionic or nonionic
polyacrylamide, or anionic or nonionic carbohydrate to which a water
resistant additive is added; and (e) a cationizing agent.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 37 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:246950 USPATFULL
TITLE: DUAL ELECTRODE SYSTEM FOR A CONTINUOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Petisce, James R., San Diego, CA, UNITED STATES
Simpson, Peter, Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| NUMBER | KIND | DATE |
|--------|------|------|
|--------|------|------|

S/N 10/589,366

PATENT INFORMATION: US 20080214918 A1 20080904
APPLICATION INFO.: US 2008-111062 A1 20080428 (12)
RELATED APPLN. INFO.: Continuation of Ser. No. US 2006-543683, filed on 4 Oct
2006, Pat. No. US 7366556 Continuation-in-part of Ser.
No. US 2004-4561, filed on 3 Dec 2004, PENDING

NUMBER DATE

PRIORITY INFORMATION: US 2003-527323P 20031205 (60)
US 2004-587787P 20040713 (60)
US 2004-614683P 20040930 (60)
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 20
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 21 Drawing Page(s)
LINE COUNT: 5616
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Disclosed herein are systems and methods for a continuous analyte
sensor, such as a continuous glucose sensor. One such system utilizes
first and second working electrodes to measure additional analyte or
non-analyte related signal. Such measurements may provide a background
and/or sensitivity measurement(s) for use in processing sensor data and
may be used to trigger events such as digital filtering of data or
suspending display of data.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 38 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:246947 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Brauker, James, Cement City, MI, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

NUMBER KIND DATE

PATENT INFORMATION: US 20080214915 A1 20080904
APPLICATION INFO.: US 2008-101810 A1 20080411 (12)
RELATED APPLN. INFO.: Continuation of Ser. No. US 2005-77714, filed on 10 Mar
2005, PENDING

NUMBER DATE

PRIORITY INFORMATION: US 2004-587787P 20040713 (60)
US 2004-587800P 20040713 (60)
US 2004-614683P 20040930 (60)
US 2004-614764P 20040930 (60)
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 16
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 23 Drawing Page(s)

S/N 10/589,366

LINE COUNT: 4024

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

L1 ANSWER 39 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2008:239335 USPATFULL

TITLE: LOW OXYGEN IN VIVO ANALYTE SENSOR

INVENTOR(S): Shults, Mark C., Madison, WI, UNITED STATES

Rhodes, Rathburn K., Madison, WI, UNITED STATES

Updike, Stuart J., Madison, WI, UNITED STATES

Brauker, James H., Cement City, MI, UNITED STATES

PATENT ASSIGNEE(S): DEXCOM, INC., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080208025 | A1 | 20080828 |
| APPLICATION INFO.: | US 2008-113508 | A1 | 20080501 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2006-333837, filed on 17 Jan 2006, PENDING Continuation-in-part of Ser. No. US 2005-77714, filed on 10 Mar 2005, PENDING Continuation-in-part of Ser. No. US 2004-838909, filed on 3 May 2004, PENDING Continuation-in-part of Ser. No. US 1999-447227, filed on 22 Nov 1999, PENDING Division of Ser. No. US 1997-811473, filed on 4 Mar 1997, Pat. No. US 6001067 | | |

| | NUMBER | DATE |
|-----------------------|-----------------|---------------|
| PRIORITY INFORMATION: | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |

DOCUMENT TYPE: Utility

FILE SEGMENT: APPLICATION

LEGAL REPRESENTATIVE: KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US

NUMBER OF CLAIMS: 15

EXEMPLARY CLAIM: 1

NUMBER OF DRAWINGS: 34 Drawing Page(s)

LINE COUNT: 5003

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous and subcutaneous measurement of glucose in a host.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 40 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2008:239119 USPATFULL

TITLE: DIP FORMING LATEX COMPOSITION

CONTAINING CROSSLINKING AGENT AND DIP

FORMED ARTICLE OBTAINED THEREFROM

INVENTOR(S): Koide, Kazuo, Yotsukaido-shi, JAPAN

PATENT ASSIGNEE(S): Four Road Research Ltd., Yotsukaido-shi, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080207809 | A1 | 20080828 |
| APPLICATION INFO.: | US 2008-52964 | A1 | 20080321 (12) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 2007-965629, filed on 27 Dec 2007, PENDING Continuation-in-part of Ser. No. WO 2007-JP62791, filed on 26 Jun 2007, PENDING | | |

| | NUMBER | DATE |
|--|--|----------|
| PRIORITY INFORMATION: | JP 2006-180764 | 20060630 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 14 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 2840 | |
| CAS INDEXING IS AVAILABLE FOR THIS PATENT. | | |
| AB | A dip-forming composition, comprising: | |

a carboxyl group-containing diene-based rubber latex; and one or more compounds selected from the following (a) to (e):

- (a) an organometallic crosslinking agent containing two or more hydroxyl groups each bonded to a metal atom;
- (b) a cationic property-deactivated modified polyamine-based resin, a cationic property-deactivated polyamide-epichlorohydrin resin, a cationic property-deactivated polyamine-epichlorohydrin resin, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyvinyl alcohol, a cationic property-deactivated amine group- or quaternary ammonium base-containing polyacrylamide, a cationic property-deactivated amine group- or quaternary ammonium base-containing carbohydrate, or a polyacrylamide, polyvinyl alcohol, or carbohydrate into which a crosslinkable functional group is introduced;
- (c) an anionic or nonionic polyvinyl alcohol, anionic or nonionic polyacrylamide, or anionic or nonionic carbohydrate to which a water resistant additive or water-resistant polymer is added;
- (d) a water resistant polyvinyl alcohol; and
- (e) a cationizing agent.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 41 OF 316 USPATFULL on STN

ACCESSION NUMBER: 2008:222037 USPATFULL

TITLE: TRANSCUTANEOUS ANALYTE SENSOR

INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Brauker, James, Cement City, MI, UNITED STATES

PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080194935 | A1 | 20080814 |
| APPLICATION INFO.: | US 2008-101790 | A1 | 20080411 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77714, filed on 10 Mar 2005, PENDING | | |

| NUMBER | DATE |
|--------|------|
|--------|------|

S/N 10/589,366

PRIORITY INFORMATION: -----
US 2004-587787P 20040713 (60)
US 2004-587800P 20040713 (60)
US 2004-614683P 20040930 (60)
US 2004-614764P 20040930 (60)
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 28
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 23 Drawing Page(s)
LINE COUNT: 4061
AB The present invention relates generally to systems and methods for
measuring an analyte in a host. More particularly, the present invention
relates to systems and methods for transcutaneous measurement of glucose
in a host.

L1 ANSWER 42 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:215060 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Brauker, James, Cement City, MI, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|---------------|
| PATENT INFORMATION: | US 20080188731 | A1 | 20080807 |
| APPLICATION INFO.: | US 2008-101806 | A1 | 20080411 (12) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77714, filed on 10 Mar 2005, PENDING | | |

| | NUMBER | DATE |
|-----------------------|--|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE, MARTENS, OLSEN & BEAR, LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 13 | |
| EXEMPLARY CLAIM: | 1-13 | |
| NUMBER OF DRAWINGS: | 23 Drawing Page(s) | |
| LINE COUNT: | 4010 | |
| AB | The present invention relates generally to systems and methods for measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host. | |

L1 ANSWER 43 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:190244 USPATFULL
TITLE: Electrophotographic photoconductor and image-forming
apparatus
INVENTOR(S): Obata, Takatsugu, Nara-shi, JAPAN

S/N 10/589,366

PATENT ASSIGNEE(S): Kondoh, Akihiro, Nara-shi, JAPAN
SHARP KABUSHIKI KAISHA, Osaka, JAPAN (non-U.S.
corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080166642 | A1 | 20080710 |
| APPLICATION INFO.: | US 2007-720 | A1 | 20071217 (12) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2006-356818 | 20061229 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | NIXON & VANDERHYE, PC, 901 NORTH GLEBE ROAD, 11TH FLOOR, ARLINGTON, VA, 22203, US | |
| NUMBER OF CLAIMS: | 8 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 3 Drawing Page(s) | |
| LINE COUNT: | 2035 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The present invention provides an electrophotographic photoconductor comprising an electroconductive substrate and a photosensitive layer provided on the electroconductive substrate, wherein the photosensitive layer comprises a charge-generating material and a charge-transporting material, the charge-transporting material comprising a compound represented by the general formula (1):

##STR1##

wherein Ar.sup.1 and Ar.sup.2 each independently represent an optionally-substituted arylene or bivalent heterocyclic group; Ar.sup.3 and Ar.sup.4 each independently represent a hydrogen atom, or an optionally-substituted aryl or monovalent heterocyclic group, but are not simultaneously hydrogen atoms; or Ar.sup.3 and Ar.sup.4 may be taken together to form an optionally-substituted bivalent cyclic hydrocarbon or heterocyclic group; and n is 0 or 1.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 44 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:183312 USPATFULL
TITLE: Electrophotographic photoreceptor, method of
preparation, and electrophotographic imaging apparatus
INVENTOR(S): Yokota, Saburo, Suwon-si, KOREA, REPUBLIC OF
Makino, Moto, Suwon-si, KOREA, REPUBLIC OF
Lee, Hwan-koo, Suwon-si, KOREA, REPUBLIC OF
Kim, Beom-jun, Yongin-si, KOREA, REPUBLIC OF
Kim, Seung-ju, Suwon-si, KOREA, REPUBLIC OF
Lee, Ji-young, Suwon-si, KOREA, REPUBLIC OF
PATENT ASSIGNEE(S): Samsung Electronics Co., Ltd. (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080160439 | A1 | 20080703 |
| APPLICATION INFO.: | US 2007-812877 | A1 | 20070622 (11) |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | KR 2006-136839 | 20061228 |

S/N 10/589,366

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: ROYLANCE, ABRAMS, BERDO & GOODMAN, L.L.P., 1300 19TH STREET, N.W., SUITE 600, WASHINGTON,, DC, 20036, US
NUMBER OF CLAIMS: 18
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 1 Drawing Page(s)
LINE COUNT: 975

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An electrophotographic photoreceptor includes a photosensitive layer including a charge generating material, a charge transporting material and a binder resin in a single layer, formed on an electrically conductive substrate. The single photosensitive layer includes an upper photosensitive layer portion and a lower photosensitive layer portion. The upper photosensitive layer portion has a higher concentration of the electron transporting material than that of the lower photosensitive layer portion. A method of preparing the electrophotographic photoreceptor, and an electrophotographic imaging apparatus employing the electrophotographic photoreceptor are provided. The single-layered type electrophotographic photoreceptor according to the present invention shows high sensitivity and excellent repetition stability of electrical properties, while still having advantages of a conventional single-layered photoreceptor, thereby being able to have highly practical applications.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 45 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:175140 USPATFULL
TITLE: IMAGE BEARING MEMBER, IMAGE FORMING APPARATUS AND PROCESS CARTRIDGE
INVENTOR(S): IKUNO, Hiroshi, Yokohama-shi, JAPAN
Suzuki, Tetsuro, Fuji-shi, JAPAN
Kami, Hidetoshi, Numazu-shi, JAPAN
Fujiwara, Yukio, Numazu-shi, JAPAN
Tamura, Hiroshi, Susono-shi, JAPAN

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080153021 | A1 | 20080626 |
| APPLICATION INFO.: | US 2007-941355 | A1 | 20071116 (11) |

| | NUMBER | DATE |
|-----------------------|----------------|----------|
| PRIORITY INFORMATION: | JP 2006-309952 | 20061116 |
| | JP 2007-259506 | 20071003 |

DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: OBLON, SPIVAK, MCCLELLAND MAIER & NEUSTADT, P.C., 1940 DUKE STREET, ALEXANDRIA, VA, 22314, US
NUMBER OF CLAIMS: 12
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 4 Drawing Page(s)
LINE COUNT: 2060

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB An image bearing member including an electrostatic substrate, a photosensitive layer located overlying the electrostatic substrate, a surface layer located overlying the photosensitive layer, and the surface layer is a cross-linking resin layer in which particulates having a needle form are dispersed and which is formed by curing a

S/N 10/589,366

monomer having at least three radical polymerizable functional groups without a charge transport structure and a radical polymerizable compound having a charge transport structure.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 46 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:117699 USPATFULL
TITLE: Electrophotographic photoreceptor, method of producing the same, process cartridge, and image-forming apparatus
INVENTOR(S): Inagaki, Tomotake, Kanagawa, JAPAN
Tada, Kazuyuki, Kanagawa, JAPAN
Sato, Tomomasa, Kanagawa, JAPAN
Morita, Naoki, Kanagawa, JAPAN
Ikeda, Kenji, Kanagawa, JAPAN
PATENT ASSIGNEE(S): FUJI XEROX CO., LTD., TOKYO, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080102389 | A1 | 20080501 |
| APPLICATION INFO.: | US 2007-806055 | A1 | 20070529 (11) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2006-292798 | 20061027 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OLIFF & BERRIDGE, PLC, P.O. BOX 320850, ALEXANDRIA, VA, 22320-4850, US | |
| NUMBER OF CLAIMS: | 17 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 15 Drawing Page(s) | |
| LINE COUNT: | 1728 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The electrophotographic photoreceptor of the present invention includes a cylindrical support; a charge-generating layer and a charge-transporting layer that are layered onto the cylindrical support in this sequence from the cylindrical support side. The charge-transporting layer includes a charge transport material, and resins including a curable resin and a thermoplastic resin. The proportion of the content of the curable resin with respect to the total amount of the resins in the charge-transporting layer increases in the layer thickness direction with distance from the charge-generating layer side.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 47 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:96273 USPATFULL
TITLE: DUAL ELECTRODE SYSTEM FOR A CONTINUOUS ANALYTE SENSOR
INVENTOR(S): Simpson, Peter C., Encinitas, CA, UNITED STATES
Brister, Mark, Encinitas, CA, UNITED STATES
Wightlin, Matthew, San Diego, CA, UNITED STATES
Pryor, Jack, San Diego, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES (U.S. corporation)

| NUMBER | KIND | DATE |
|--------|------|------|
|--------|------|------|

S/N 10/589,366

PATENT INFORMATION: US 20080083617 A1 20080410
APPLICATION INFO.: US 2007-865572 A1 20071001 (11)
RELATED APPLN. INFO.: Continuation-in-part of Ser. No. US 2006-543683, filed
on 4 Oct 2006, PENDING
DOCUMENT TYPE: Utility
FILE SEGMENT: APPLICATION
LEGAL REPRESENTATIVE: KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET,
FOURTEENTH FLOOR, IRVINE, CA, 92614, US
NUMBER OF CLAIMS: 94
EXEMPLARY CLAIM: 1
NUMBER OF DRAWINGS: 26 Drawing Page(s)
LINE COUNT: 6616

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB Disclosed herein are systems and methods for a continuous analyte
sensor, such as a continuous glucose sensor. One such system utilizes
first and second working electrodes to measure additional analyte or
non-analyte related signal. Such measurements may provide a background
and/or sensitivity measurement(s) for use in processing sensor data and
may be used to trigger events such as digital filtering of data or
suspending display of data.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L1 ANSWER 48 OF 316 USPATFULL on STN
ACCESSION NUMBER: 2008:81024 USPATFULL
TITLE: TRANSCUTANEOUS ANALYTE SENSOR
INVENTOR(S): Brister, Mark, Encinitas, CA, UNITED STATES
Neale, Paul V., San Diego, CA, UNITED STATES
Saint, Sean, San Diego, CA, UNITED STATES
Petisce, James R., San Diego, CA, UNITED STATES
McGee, Thomas F., San Diego, CA, UNITED STATES
Codd, Daniel Shawn, Escondido, CA, UNITED STATES
Petersen, David Michael, Escondido, CA, UNITED STATES
Kline, Daniel S., Encinitas, CA, UNITED STATES
PATENT ASSIGNEE(S): DexCom, Inc., San Diego, CA, UNITED STATES, 92121 (U.S.
corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20080071156 | A1 | 20080320 |
| APPLICATION INFO.: | US 2007-925603 | A1 | 20071026 (11) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 2005-77763, filed on 10 Mar 2005, GRANTED, Pat. No. US 7310544 | | |

| | NUMBER | DATE |
|-----------------------|---|---------------|
| PRIORITY INFORMATION: | US 2004-587787P | 20040713 (60) |
| | US 2004-587800P | 20040713 (60) |
| | US 2004-614683P | 20040930 (60) |
| | US 2004-614764P | 20040930 (60) |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | KNOBBE MARTENS OLSON & BEAR LLP, 2040 MAIN STREET, FOURTEENTH FLOOR, IRVINE, CA, 92614, US | |
| NUMBER OF CLAIMS: | 21 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 23 Drawing Page(s) | |
| LINE COUNT: | 4074 | |

AB The present invention relates generally to systems and methods for

measuring an analyte in a host. More particularly, the present invention relates to systems and methods for transcutaneous measurement of glucose in a host.

L1 ANSWER 49 OF 316 USPATFULL on STN
 ACCESSION NUMBER: 2008:80009 USPATFULL
 TITLE: Electrophotographic photoreceptor, method of producing the same, process cartridge, and image-forming apparatus
 INVENTOR(S): Tada, Kazuyuki, Kanagawa, JAPAN
 Inagaki, Tomotake, Kanagawa, JAPAN
 Agatsuma, Masaru, Kanagawa, JAPAN
 Sato, Tomomasa, Kanagawa, JAPAN
 PATENT ASSIGNEE(S): FUJI XEROX CO., LTD., TOKYO, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 20080070135 | A1 | 20080320 |
| APPLICATION INFO.: | US 2007-730492 | A1 | 20070402 (11) |

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 2006-254761 | 20060920 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OLIFF & BERRIDGE, PLC, P.O. BOX 320850, ALEXANDRIA, VA, 22320-4850, US | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 21 Drawing Page(s) | |
| LINE COUNT: | 1684 | |

AB The invention provides an electrophotographic photoreceptor that includes a cylindrical support, and a charge-generating layer and a charge-transporting layer on the cylindrical support, wherein a content per unit volume of a charge-generating material in the charge-generating layer increases from a center portion in an axial direction of the cylindrical support towards both end portions thereof, and a thickness of the charge-generating layer in an axial direction of the cylindrical support is 95% or more and 105% or less relative to an average thickness of the charge-generating layer.

=> d 11 49 ibib hit

L1 ANSWER 49 OF 316 USPATFULL on STN
 ACCESSION NUMBER: 2008:80009 USPATFULL
 TITLE: Electrophotographic photoreceptor, method of producing the same, process cartridge, and image-forming apparatus
 INVENTOR(S): Tada, Kazuyuki, Kanagawa, JAPAN
 Inagaki, Tomotake, Kanagawa, JAPAN
 Agatsuma, Masaru, Kanagawa, JAPAN
 Sato, Tomomasa, Kanagawa, JAPAN
 PATENT ASSIGNEE(S): FUJI XEROX CO., LTD., TOKYO, JAPAN (non-U.S. corporation)

| NUMBER | KIND | DATE |
|--------|------|------|
|--------|------|------|

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| | | | |
|---------------------|----------------|----|---------------|
| PATENT INFORMATION: | US 20080070135 | A1 | 20080320 |
| APPLICATION INFO.: | US 2007-730492 | A1 | 20070402 (11) |

| | | |
|-----------------------|--|----------|
| | NUMBER | DATE |
| PRIORITY INFORMATION: | JP 2006-254761 | 20060920 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | OLIFF & BERRIDGE, PLC, P.O. BOX 320850, ALEXANDRIA, VA, 22320-4850, US | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 21 Drawing Page(s) | |
| LINE COUNT: | 1684 | |

DETD The charge-generating materials used include those known in the art, for example azo pigments such as bisazo and trisazo; condensed ring aromatic pigments such as dibromoanthanthrone; organic pigments such as perylene pigment, pyrrolopyrrole pigment and phthalocyanine pigment; and inorganic pigments such as triclinic selenium and zinc oxide. In particular, metal or nonmetal phthalocyanine pigments, triclinic selenium, and dibromoanthanthrone are preferable.

DETD From the viewpoint of the necessity for a region for attaching a jig required for arranging the photoreceptor in an image-forming apparatus, a region Q at which the layer is not formed is preferably provided between the end B of the charge-generating layer and the end C of the cylindrical support. When the charge-generating layer and the charge-transporting layer are formed by dip coating, a formed coating extends to the end of the base material (the cylindrical support), and thus a coating formed on the jig-attaching region is wiped off.

DETD An electron transportable pigment may be mixed or dispersed in the undercoat layer 1. The electron transportable pigment include organic pigments such as perylene pigment described in JP-A No. 47-30330, bisbenzimidazole perylene pigment, polycyclic quinone pigment, indigo pigment and quinacridone pigment; organic pigments such as bisazo pigment and phthalocyanine pigment having an electron attractive substituent group such as a cyano group, a nitro group, a nitroso group and a halogen atom; and inorganic pigments such as zinc oxide and titanium oxide.

DETD Among these pigments, perylene pigment, bisbenzimidazole perylene pigment, polycyclic quinone pigment, zinc oxide and titanium oxide are preferably used.

DETD Various organic compound powder or inorganic compound powder may be added to the undercoat layer 1 for the purpose of improving the electric properties and the light-scatterability of the layer. In particular, white pigments such as titanium oxide, zinc oxide, zinc white, zinc sulfide, lead white or lithopone; inorganic pigments as body pigments such as alumina, calcium carbonate or barium sulfate; Teflon (trade name) resin particles, benzoguanamine resin particles or styrene particles are effective.

=> dhis

DHIS IS NOT A RECOGNIZED COMMAND

The previous command name entered was not recognized by the system.

For a list of commands available to you in the current file, enter

"HELP COMMANDS" at an arrow prompt (=>).

S/N 10/589,366

=> d his

(FILE 'HOME' ENTERED AT 13:51:49 ON 17 SEP 2009)
SET ABBR ON PERM
SET PLURALS ON PERM

FILE 'USPATFULL, USPATOLD, USPAT2, CAPLUS, JAPIO' ENTERED AT 13:52:48 ON
17 SEP 2009

L1 316 S DIP(1A) (FORMED OR FORMING) AND ZINC(2A)OXIDE#
L2 3372 S CARBOXY?(4A) ((STYREN?(1A) (BUTADIEN? OR ISOPREN?)) (4A) (RUBBER#
L3 13 S L1 AND L2
L4 17207 S LATEX### AND ZINC(2A)OXIDE#
L5 217 S L2 AND L4
L6 38243 S LATEX### AND (SULFUR OR VULCANI?)
L7 151 S L5 AND L6
L8 63719 S LATEX### AND PH
L9 71 S L7 AND L8
L10 20055 S (SULFUR OR VULCANI?) (S) (ZINC(1A)OXIDE#)
L11 49 S L9 AND L10

=> s 14 and 16

L12 9141 L4 AND L6

=> s (styren?(s) (butadien? or isopren?) (s) (acrylic acid or
vinyl(1a)sulfonic(1a)acid))

L13 27922 (STYREN?(S) (BUTADIEN? OR ISOPREN?) (S) (ACRYLIC ACID OR VINYL(1A)
SULFONIC(1A) ACID))

=> s 112 and 113

L14 1277 L12 AND L13

=> s 18 and 114

L15 803 L8 AND L14

=> s 115 and 110

L16 222 L15 AND L10

=> s latex## and dip(2a)form?

L17 900 LATEX## AND DIP(2A) FORM?

=> s 116 and 117

L18 15 L16 AND L17

=> d 118 1-15 ibib abs

L18 ANSWER 1 OF 15 USPATFULL on STN

ACCESSION NUMBER: 2005:13324 USPATFULL

TITLE: Latex for dip forming and
molded object obtained by dip forming

INVENTOR(S): Hagiwara, Katuo, Kawasaki, JAPAN

Ota, Hisanori, Kawasaki, JAPAN

PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|-----------------------|
| PATENT INFORMATION: | US 6844385 | B1 | 20050118 |
| | WO 2001000726 | | 20010104 |
| APPLICATION INFO.: | US 2001-19232 | | 20011228 (10) |
| | WO 2000-JP4169 | | 20000626 |
| | | | 20011228 PCT 371 date |

S/N 10/589,366

| | NUMBER | DATE |
|-----------------------|--|----------|
| PRIORITY INFORMATION: | JP 1999-181165 | 19990628 |
| | JP 1999-182428 | 19990628 |
| | JP 1999-215284 | 19990729 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Yoon, Tae H. | |
| LEGAL REPRESENTATIVE: | Birch, Stewart, Kolasch & Birch, LLP | |
| NUMBER OF CLAIMS: | 8 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 1 Drawing Figure(s); 1 Drawing Page(s) | |
| LINE COUNT: | 886 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A latex for dip forming which comprises a copolymer prepared by polymerizing 10 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 10 to 89.9% by weight of other ethylenically unsaturated monomer or monomers copolymerizable therewith, wherein the sum of the amount of acid groups bonded to or adsorbed on the surface of the copolymer constituting the latex and the amount of acid groups present in the aqueous phase of the copolymer latex is in the range of 0.1 to 2 meq. in terms of hydrochloric acid, per gram of the copolymer. This latex is dip-formed to give a dip-formed article having no fear of development of a protein allergy, and exhibiting a soft feeling and a high mechanical strength.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 2 OF 15 USPATFULL on STN
ACCESSION NUMBER: 2004:286884 USPATFULL
TITLE: Antistatic polymers, blends, and articles
INVENTOR(S): Bialke, Julie Vaughn, Akron, OH, UNITED STATES
Canady, John B., Akron, OH, UNITED STATES
Hsu, Shui-Jen Raymond, Westlake, OH, UNITED STATES
Lubnin, Alexander V., Copley, OH, UNITED STATES
Masler, William F., III, Hinckley, OH, UNITED STATES
Valentino, Beth A., Broadview Hts., OH, UNITED STATES
PATENT ASSIGNEE(S): Noveon IP Holdings Corp. (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|---------------|
| PATENT INFORMATION: | US 20040225052 | A1 | 20041111 |
| APPLICATION INFO.: | US 2004-797378 | A1 | 20040310 (10) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 2000-609077, filed on 30 Jun 2000, GRANTED, Pat. No. US 6794475 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | APPLICATION | | |
| LEGAL REPRESENTATIVE: | NOVEON IP HOLDINGS CORP., 9911 BRECKSVILLE ROAD, CLEVELAND, OH, 44141-3247 | | |
| NUMBER OF CLAIMS: | 61 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 1432 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB This invention relates to latex polymers and blends of such latex polymers used to produce gloves, coatings, binders for papers and nonwovens, and other articles having superior electrostatic dissipative properties. Such articles have a surface resistivity value

below $1+10^{\text{sup.11}}$ ohms/square per square, a static decay time of less than 1 second, or both.

The blends comprise one or more (1) polymers (in latex, solution or dispersion form) of (a) at least one reactive macromer of at least one alkylene oxide having at least one functional group capable of free-radical transformation, (b) optionally at least one ethylenically unsaturated monomer having at least one carboxylic acid group, and (c) optionally one or more free radically polymerizable comonomers, and (2) one or more other polymer latexes or dispersions of such polymers as natural rubber, conjugated-diene-containing polymers, hydrogenated styrene-butadiene triblock copolymers, chlorosulfonated polyethylenes, ethylene copolymers, acrylic and/or methacrylic ester copolymers, vinyl chloride copolymers, vinylidene chloride copolymers, polyisobutylenes, polyurethanes, polyureas, and poly(urethane-urea)s.

Also suitable for making antistatic articles such as gloves by coagulant dipping processes, even in the absence of said (2) other polymer latexes or dispersions, are (1) polymers (in latex, solution or dispersion form) of (a) at least one reactive macromer of at least one alkylene oxide having at least one functional group capable of free-radical transformation, wherein said macromer comprises less than about 10 weight % of total polymer weight in the (1) latex, solution or dispersion polymers, (b) optionally at least one ethylenically unsaturated monomer having at least one carboxylic acid group, and (c) one or more free radically polymerizable comonomers.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 3 OF 15 USPATFULL on STN

ACCESSION NUMBER: 2004:235580 USPATFULL
 TITLE: Antistatic polymers, blends, and articles
 INVENTOR(S): Bialke, Julie Vaughn, Akron, OH, United States
 Canady, John B., Akron, OH, United States
 Hsu, Shui-Jen Raymond, Westlake, OH, United States
 Lubnin, Alexander V., Copley, OH, United States
 Masler, III, William F., Hinckley, OH, United States
 Valentino, Beth A., Broadview Hts., OH, United States
 PATENT ASSIGNEE(S): Noveon IP Holdings Corp., Cleveland, OH, United States
 (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 6794475 | B1 | 20040921 |
| APPLICATION INFO.: | US 2000-609077 | | 20000630 (9) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | GRANTED | | |
| PRIMARY EXAMINER: | Zalukaeva, Tatyana | | |
| LEGAL REPRESENTATIVE: | Dunlap, Thoburn T., Hudak, Shunk & Farine Co. LPA | | |
| NUMBER OF CLAIMS: | 6 | | |
| EXEMPLARY CLAIM: | 1 | | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | | |
| LINE COUNT: | 1120 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB This invention relates to latex polymers and blends of such latex polymers used to produce articles having superior electrostatic dissipative properties. The polymers and blends comprise one or more (1) polymers, in latex, or dispersion form, of (a) at least one reactive macromer of at least one alkylene oxide having at least one functional group capable of free-radical transformation, (b)

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optionally, at least one ethylenically unsaturated monomer having at least one carboxylic acid group, and (c) optionally, one or more free radically polymerizable comonomers, and (2) one or more other polymer latexes or dispersions of such polymers as natural rubber, conjugated-diene-containing polymers, hydrogenated styrene-butadiene triblock copolymers, chlorosulfonated polyethylenes, ethylene copolymers, acrylic and/or methacrylic ester copolymers, vinyl chloride copolymers, vinylidene chloride copolymers, polyisobutylenes, polyurethanes, polyureas, and poly-urethane-urea)s.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 4 OF 15 USPATFULL on STN

ACCESSION NUMBER: 2004:168052 USPATFULL
TITLE: Coating material and molded article
INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
Inoue, Toshihiro, Kawasaki, JAPAN
PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|---------------|
| PATENT INFORMATION: | US 6759473 | B1 | 20040706 |
| | WO 2001036553 | | 20010525 |
| APPLICATION INFO.: | US 2002-129956 | | 20020520 (10) |
| | WO 2000-JP8164 | | 20001120 |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 1999-327825 | 19991118 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Reddick, Judy M. | |
| LEGAL REPRESENTATIVE: | Armstrong, Kratz, Quintos, Hanson & Brooks, LLP | |
| NUMBER OF CLAIMS: | 15 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 1247 | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB By coating a dip-formed article with a coating agent comprising a polymer latex dispersion-stabilized with a water-soluble high-molecular-weight compound containing an alcoholic hydroxyl group, a coated article having excellent donning and putting off properties and anti-blocking property, and exhibiting greatly reduced fine particles-releasability is obtained.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 5 OF 15 USPATFULL on STN

ACCESSION NUMBER: 2002:25127 USPATFULL
TITLE: Rubber glove and process for producing same
INVENTOR(S): Nakamura, Misao, Kawasaki-shi, JAPAN
Inoue, Toshihiro, Kawasaki-shi, JAPAN
PATENT ASSIGNEE(S): ZEON CORPORATION, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 20020013963 | A1 | 20020207 |
| | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | A1 | 20010627 (9) |

S/N 10/589,366

| | NUMBER | DATE |
|-----------------------|---|----------|
| | ----- | ----- |
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | APPLICATION | |
| LEGAL REPRESENTATIVE: | ARMSTRONG, WESTERMAN, HATTORI,, MCLELAND & NAUGHTON, LLP, 1725 K STREET, NW, SUITE 1000, WASHINGTON, DC, 20006 | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| LINE COUNT: | 855 | |
| AB | A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other. | |

L18 ANSWER 6 OF 15 USPATFULL on STN
ACCESSION NUMBER: 92:7403 USPATFULL
TITLE: Latex gloves with improved donnability
INVENTOR(S): Szczechura, Bernard J., Smyrna, DE, United States
Durney Cronin, Rebecca L., Townsend, DE, United States
PATENT ASSIGNEE(S): Reichhold Chemicals, Inc., Durham, NC, United States
(U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--------------------|-------|--------------|
| | ----- | ----- | ----- |
| PATENT INFORMATION: | US 5084514 | | 19920128 |
| APPLICATION INFO.: | US 1990-613313 | | 19901114 (7) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Schofer, Joseph L. | | |
| ASSISTANT EXAMINER: | Nagumo, M. | | |
| LEGAL REPRESENTATIVE: | Rodman & Rodman | | |
| NUMBER OF CLAIMS: | 15 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 463 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A polymer latex for making gloves having excellent donning and doffing characteristics comprises a carboxylated open chain aliphatic diene/acrylonitrile/(meth)acrylate terpolymer. A process for making latex gloves using the polymer latex prepared in accordance with the invention is also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 7 OF 15 USPATFULL on STN
ACCESSION NUMBER: 84:14461 USPATFULL
TITLE: Coating rubber with a composition which resists removal by water

S/N 10/589,366

INVENTOR(S): Kuan, Tiong H., Stow, OH, United States
Sommer, John G., Hudson, OH, United States
PATENT ASSIGNEE(S): The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4436857 | | 19840313 |
| APPLICATION INFO.: | US 1981-290637 | | 19810806 (6) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 1980-213433, filed on 5 Dec 1980, now abandoned which is a continuation of Ser. No. US 1979-93771, filed on 13 Nov 1979, now abandoned which is a division of Ser. No. US 1979-21380, filed on 19 Mar 1979, now patented, Pat. No. US 4217395, issued on 12 Aug 1980 which is a continuation-in-part of Ser. No. US 1978-931597, filed on 7 Aug 1978, now abandoned | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Michl, Paul R. | | |
| NUMBER OF CLAIMS: | 5 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 923 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A carboxylated polymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the polymer and which also can contain fillers, wetting agents and stabilizers can be used to provide a water resistant film on the surface of a with rubber compound or composition which subsequently can be cooled rapidly wiht water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 8 OF 15 USPATFULL on STN

ACCESSION NUMBER: 82:49700 USPATFULL
TITLE: Rubber slab dip
INVENTOR(S): Kuan, Tiong H., Stow, OH, United States
PATENT ASSIGNEE(S): The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4354001 | | 19821012 |
| APPLICATION INFO.: | US 1981-332689 | | 19811221 (6) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1980-212788, filed on 4 Dec 1980, now patented, Pat. No. US 4331738 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Schofer, Joseph L. | | |
| ASSISTANT EXAMINER: | Sarofim, N. | | |
| NUMBER OF CLAIMS: | 3 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 649 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A composition of a blend of a carboxylated copolymer latex and an acrylate copolymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the composition and which also can contain fillers, wetting agents and stabilizers, and so forth can be used to provide a water resistant film on the surface of a hot rubber compound or composition which subsequently can be cooled rapidly

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with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 9 OF 15 USPATFULL on STN

ACCESSION NUMBER: 82:25402 USPATFULL

TITLE: Blend of a carboxylated copolymer latex and of an acrylate copolymer latex for coating rubber and product

INVENTOR(S): Kuan, Tiong H., Stow, OH, United States

PATENT ASSIGNEE(S): The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|---------------------|------|--------------|
| PATENT INFORMATION: | US 4331738 | | 19820525 |
| APPLICATION INFO.: | US 1980-212788 | | 19801204 (6) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Morgenstern, Norman | | |
| ASSISTANT EXAMINER: | Childs, S. L. | | |
| NUMBER OF CLAIMS: | 8 | | |
| EXEMPLARY CLAIM: | 1,5 | | |
| LINE COUNT: | 705 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A composition of a blend of a carboxylated copolymer latex having a Tg of not less than about -30° C. such as a copolymer of styrene, itaconic and methacrylic acids and butadiene-1,3 and an acrylate copolymer latex having a Tg of not less than about +30° C. such as a copolymer of ethylacrylate, methyl methacrylate and acrylamide containing a minor amount by weight of a heat sensitizer sufficient to gel the composition and which also can contain fillers, wetting agents and stabilizers, and so forth can be used to provide a water resistant film on the surface of a hot rubber compound or composition which subsequently can be cooled rapidly with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 10 OF 15 USPATFULL on STN

ACCESSION NUMBER: 81:13649 USPATFULL

TITLE: Methods and means for improvings resin bonds between substrates, and materials therefor and products therefrom

INVENTOR(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States

Hunt, Barbara P., Pompano Beach, FL, United States

PATENT ASSIGNEE(S): Darrah, Marion, Pompano Beach, FL, United States (U.S. individual)
Houghton, Joseph Y., Pompano Beach, FL, United States (U.S. individual) co-trustees

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4255486 | | 19810310 |
| APPLICATION INFO.: | US 1979-83768 | | 19791011 (6) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1978-951040, filed on 13 Oct 1978, now abandoned which is a division of Ser. No. US | | |

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1976-754182, filed on 29 Dec 1976, now patented, Pat.
No. US 4131584 which is a division of Ser. No. US
1973-422777, filed on 7 Dec 1973, now patented, Pat.
No. US 4012350 which is a division of Ser. No. US
1972-219173, filed on 19 Jan 1972, now patented, Pat.
No. US 3922468

DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Lesmes, George F.
ASSISTANT EXAMINER: Thomas, Alexander S.
LEGAL REPRESENTATIVE: Hall & Houghton
NUMBER OF CLAIMS: 3
EXEMPLARY CLAIM: 1
LINE COUNT: 2809

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The strength of the bond obtained between substates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, is improved by applying, to at least one of the substrates, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter, a quantity of m-aminophenol, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip. Adhesive/promoter blends and latex/promoter blends for forming the same are also disclosed.

This is a division of application Ser. Number 951,040, filed October 13, 1978, now abandoned, which in turn is a division of Ser. Number 754,182, filed December 29, 1976, now U.S. Pat. Number 4,131,584 which in turn is a division of Ser. Number 422,777, filed December 7, 1973, now U.S. Pat. Number 4,012,350 which in turn is a division of Ser. Number 219,173 filed January 19, 1972, now U.S. Pat. Number 3,922,468.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 11 OF 15 USPATFULL on STN

ACCESSION NUMBER: 80:39399 USPATFULL
TITLE: Method of coating rubber with a composition which
resists removal by water
INVENTOR(S): Kuan, Tiong Ho, Stow, OH, United States
Sommer, John G., Hudson, OH, United States
PATENT ASSIGNEE(S): The General Tile & Rubber Company, Akron, OH, United
States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|--|------|--------------|
| PATENT INFORMATION: | US 4217395 | | 19800812 |
| APPLICATION INFO.: | US 1979-21380 | | 19790319 (6) |
| RELATED APPLN. INFO.: | Continuation-in-part of Ser. No. US 1978-931597, filed on 7 Aug 1978, now abandoned | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Esposito, Michael F. | | |
| ASSISTANT EXAMINER: | Childs, S. L. | | |
| NUMBER OF CLAIMS: | 11 | | |
| EXEMPLARY CLAIM: | 1,6 | | |
| LINE COUNT: | 950 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A carboxylated polymer latex containing a minor amount by

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weight of a heat sensitizer sufficient to gel the polymer and which also can contain fillers, wetting agents and stabilizers can be used to provide a water resistant film on the surface of a hot rubber compound or composition which subsequently can be cooled rapidly with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 12 OF 15 USPATFULL on STN

ACCESSION NUMBER: 78:70199 USPATFULL
TITLE: Elastomer latex composition
INVENTOR(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States
Hunt, Barbara P., Pompano Beach, FL, United States
PATENT ASSIGNEE(S): Marion Darrah and Joseph Y. Houghton, Co-trustees, Pompano Beach, FL, United States (U.S. individual)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4131584 | | 19781226 |
| APPLICATION INFO.: | US 1976-754182 | | 19761229 (5) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1973-422777, filed on 7 Dec 1973, now patented, Pat. No. US 4012350 which is a division of Ser. No. US 1972-219173, filed on 19 Jan 1972, now patented, Pat. No. US 3922468 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Jacobs, Lewis T. | | |
| LEGAL REPRESENTATIVE: | Hall & Houghton | | |
| NUMBER OF CLAIMS: | 5 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 2750 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The strength of the bond obtained between substrates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, is improved by applying, to at least one of the substrates, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter, a quantity of m-aminophenol, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip. Adhesive/promoter blends and latex/promoter blends for forming the same are also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 13 OF 15 USPATFULL on STN

ACCESSION NUMBER: 77:12759 USPATFULL
TITLE: Liquid adhesive from phenoplast and m-aminophenol
INVENTOR(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States
Hunt, Barbara P., Pompano Beach, FL, United States
PATENT ASSIGNEE(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States (U.S. individual)

| | NUMBER | KIND | DATE |
|---------------------|------------|------|----------|
| PATENT INFORMATION: | US 4012350 | | 19770315 |

APPLICATION INFO.: US 1973-422777 19731207 (5)
RELATED APPLN. INFO.: Division of Ser. No. US 1972-219173, filed on 19 Jan
1972, now patented, Pat. No. US 3922468
DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Tillman, Murray
ASSISTANT EXAMINER: Koeckert, A. H.
LEGAL REPRESENTATIVE: Hall & Houghton
NUMBER OF CLAIMS: 15
EXEMPLARY CLAIM: 1
LINE COUNT: 2857

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The strength of the bond obtained between substrates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, is improved by applying, to at least one of the substrates, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter, a quantity of m-aminophenol, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip. Adhesive/promoter blends and latex/promoter blends for forming the same are also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 14 OF 15 USPATFULL on STN
ACCESSION NUMBER: 75:64327 USPATFULL
TITLE: Fiber-elastomer laminates utilizing an unresinified m-aminophenol primer
INVENTOR(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States
Hunt, Barbara P., Pompano Beach, FL, United States
PATENT ASSIGNEE(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States (U.S. individual)

| | NUMBER | KIND | DATE |
|-----------------------|----------------------|------|--------------|
| PATENT INFORMATION: | US 3922468 | | 19751125 |
| APPLICATION INFO.: | US 1972-219173 | | 19720119 (5) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Van Horn, Charles E. | | |
| ASSISTANT EXAMINER: | Dawson, Robert A. | | |
| LEGAL REPRESENTATIVE: | Hall & Houghton | | |
| NUMBER OF CLAIMS: | 27 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 2859 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The strength of the bond obtained between substrates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, is improved by applying, to at least one of the substrates, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter a quantity of m-aminophenol, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip. Adhesive/promoter blends and latex/promoter blends for forming the same are also disclosed.

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

L18 ANSWER 15 OF 15 USPAT2 on STN

ACCESSION NUMBER: 2002:25127 USPAT2
 TITLE: Rubber glove and process for producing same
 INVENTOR(S): Nakamura, Misao, Kawasaki, JAPAN
 Inoue, Toshihiro, Kawasaki, JAPAN
 PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|----------------|------|--------------|
| PATENT INFORMATION: | US 6345394 | B2 | 20020212 |
| APPLICATION INFO.: | US 2001-891385 | | 20010627 (9) |

| | NUMBER | DATE |
|-----------------------|---|----------|
| PRIORITY INFORMATION: | JP 2000-196240 | 20000629 |
| DOCUMENT TYPE: | Utility | |
| FILE SEGMENT: | GRANTED | |
| PRIMARY EXAMINER: | Calvert, John J. | |
| ASSISTANT EXAMINER: | Muromoto, Robert H. | |
| LEGAL REPRESENTATIVE: | Armstrong, Westerman, Hattori, McLeland & Naughton, LLP | |
| NUMBER OF CLAIMS: | 10 | |
| EXEMPLARY CLAIM: | 1 | |
| NUMBER OF DRAWINGS: | 0 Drawing Figure(s); 0 Drawing Page(s) | |
| LINE COUNT: | 815 | |

AB A rubber glove comprising a main rubber layer and an inner covering layer, bonded to the main rubber layer, containing resin particles is disclosed. The resin particles are partially exposed on the skin-contacting surface of the inner covering layer to an extent such that, among resin particles visually observed in unit area of the skin-contacting surface, resin particles having a maximum particle diameter of 2-20 μm have a total projected area ratio A of 5-50%, as defined by the formula: $A(\%) = B/C + 100$, where B is total projected area of resin particles with a maximum particle diameter of 2-20 μm , and C is the unit area. The rubber glove can be easily donned and pulled off, and resin particles do not fall or do fall off only to a very slight extent upon donning or pulling off, and, when the inner covering layer is placed in contact with each other, the layer does not easily stick to each other.

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L18 ANSWER 13 OF 15 USPATFULL on STN

ACCESSION NUMBER: 77:12759 USPATFULL
 TITLE: Liquid adhesive from phenoplast and m-aminophenol
 INVENTOR(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States
 Hunt, Barbara P., Pompano Beach, FL, United States
 PATENT ASSIGNEE(S): Burke, Jr., Oliver W., Fort Lauderdale, FL, United States (U.S. individual)

| | NUMBER | KIND | DATE |
|-----------------------|--------------------------------------|------|-----------------|
| PATENT INFORMATION: | US 4012350 | | 19770315 |
| APPLICATION INFO.: | US 1973-422777 | | 19731207 (5) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1972-219173, | | filed on 19 Jan |

1972, now patented, Pat. No. US 3922468
DOCUMENT TYPE: Utility
FILE SEGMENT: Granted
PRIMARY EXAMINER: Tillman, Murray
ASSISTANT EXAMINER: Koeckert, A. H.
LEGAL REPRESENTATIVE: Hall & Houghton
NUMBER OF CLAIMS: 15
EXEMPLARY CLAIM: 1
LINE COUNT: 2857
CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB The strength of the bond obtained between substrates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, is improved by applying, to at least one of the substrates, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter, a quantity of m-aminophenol, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip. Adhesive/promoter blends and latex/promoter blends for forming the same are also disclosed.

SUMM This invention pertains to the adhering of substrates to one another, and is particularly but not exclusively applicable to the adhering of fibrous material to elastomers, more particularly with the aid of adhesive dips dried on the fibrous material before assembly to the elastomer and vulcanization thereof; and to the provision of adhesive compositions therefor.

SUMM It is known to pretreat various substrates, e.g. fibrous material, with adhesive resorcinol formaldehyde resin (RF) dips, with such RF dips containing a proportion of elastomer latex (RFL dips), and/or with epoxy resin dips, and to dry the same on the fibrous material before assembling the same with another substrate, e.g. a vulcanizable elastomer and curing the same, for the purpose of providing a bond between the substrates, and especially between a vulcanizate and the fibrous material. Examples of such treatments are disclosed in British Patent No. 1,141,807 published Feb. 5, 1969.

SUMM The present invention aims to promote or increase the strength of the bond obtained between substrates with the aid of phenoplasts, modified phenoplasts and/or epoxy resins, e.g. between fibrous material and an elastomer on vulcanization thereof, and this object is accomplished in accordance with the present invention, by applying to the substrate, in addition to a preformed phenoplast, modified preformed phenoplast, and/or preformed epoxy resin, and drying thereon before the assembly thereof with the other substrate, as an adhesion promoter, a quantity of m-aminophenol selected according to definition 15 hereinafter, which may be blended in a phenoplast adhesive, such as an RF dip or an RFL dip, or may be blended in the elastomer latex used for forming an RFL dip, and such blends constitute useful combinations embraced in the invention.

SUMM 1. Rubber or elastomer. The terms "rubber," "rubber material," "elastomer," and "elastomer material" are used herein to designate elastomeric material or rubbery materials including natural rubbers and the synthetic rubbers which are capable of being cured or vulcanized, as by the aid of heat and suitable vulcanizing agents. The vulcanizing agents, depending on the particular elastomer, may be of the sulfur type and/or

of the free radical type, e.g., the peroxide or hydroperoxide type, and/or of other types. Such rubbers include homopolymers and copolymers of conjugated dienes such as polychloroprene, polybutadiene, polyisoprene and copolymers of chloroprene, butadiene and isoprene with vinyl monomers, such as the copolymers of butadiene-styrene, butadiene-acrylonitrile and the like, copolymers of isobutylene and isoprene (the butyl rubbers), copolymers of ethylene and propylene, terpolymers of ethylene, propylene and a non-conjugated diene and other elastomers, e.g. fluorocarbon elastomers, as Viton B or Fluorel.

SUMM The term "vulcanizable elastomer" as used herein designates a rubber compounded with suitable compounding ingredients including a vulcanizing agent so as to be capable of being cured or vulcanized, as by the aid of heat. The vulcanizable elastomer may be applied in any suitable manner, e.g. by calendering, pressing in a mold or deposition from an aqueous or solvent dispersion.

SUMM The term "epoxy resin" as used herein connotes a component for coating substrates, e.g. fibrous materials, consisting essentially of organic material having at least 2 epoxy groups, i.e. ##STR1## groups per molecule, or of such material in combination with diisocyanate material, e.g. "Hylene MP" commercially available from the duPont Company. Such epoxy resins may be obtained by reacting for example epichlorohydrin with a polyhydric phenol such as bis-(4-hydroxyphenyl)-2,2-propane, bis-(hydroxyphenyl) methane. Examples of such compounds are described in U.S. Patents 2,324,483; 2,444,333; 2,494,295; 2,500,600; 2,511,913; 2,943,095; 2,872,427; 3,488,314; 1,888,358; 2,943,095, and 3,525,703 herein incorporated by reference; and the commercially available epoxy-resins are included hereunder as for example the ERL resins sold by the Union Carbide Corporation under the trade names "ERL 2774," "ERL 3794," "ERL 2794," "ERL 4289," and "ERL 2774," the Epon resins, sold by the Shell Chemical Company, i.e., Epon 1001, Epon 1004, Epon 1007, Epon 1009, Epon 815 and Epon 828; the Araldite resins sold by the Ciba Company, Inc. designated as Araldite 6010, Araldite 502 and Araldite 6020; and GenEpoxy Resins sold by General Mills Chemical Division, i.e. GenEpoxy 175, 190, 525 and M-180, and others. The epoxy resin compounds which are insoluble in water may be supplied as a dip in the form of a solvent solution or an aqueous emulsion or a colloidal dispersion.

SUMM 10. RF Resin. The term "resorcinol formaldehyde resin" or "RF resin" as used by the trade and herein means an acid or basic catalyzed phenolic resin which consists essentially of the reaction product of a substituted phenol and an aldehyde, heat hardening per se or with the aid of a methylene donor and/or metal oxide. Suitable substituted phenols include phenols having substituents selected from the groups consisting of -OH, -NH₂ or -OCOCH₃ groups, such as resorcinol, m-aminophenol, resorcinol monoacetate, 1,5-naphthalenediol and other typical phenols employed to form phenolic type adhesives and combinations of such phenols. Suitable aldehydes for the reaction include furfural, acrolein, glyoxal, and especially formaldehyde which may be employed as formalin (37% by weight formaldehyde gas in water), and combinations of two or more thereof. The resin forming reaction is preferably carried out in water with the aid of an alkali metal hydroxide or carbonate such as sodium hydroxide or sodium carbonate; or with aqueous ammonia; or with a water soluble or dispersible amine such as monoethanolamine, diethanolamine, triethanolamine, and/or the unsaturated amines such as diallylamine, triallylamine, and the vinylamine monomers, e.g. t-butylaminoethyl methacrylate and dimethylaminoethyl methacrylate. The RF resin may be applied to the

fibrous material or pretreated fibrous material in the form of a dip and dried thereon as above described.

SUMM 12. Adhesive Composition. The term "adhesive composition" as used herein includes phenoplasts with and without modifying polymer dispersed in a liquid dispersing medium, or carried by a carrier sheet. In the liquid dispersion form it is exemplified by the resorcinol formaldehyde (RF) dips, and the resorcinol formaldehyde elastomer latex (RFL) dips. The adhesive composition is applied as a liquid dispersion in a liquid dispersing medium and said liquid is preferably a volatile organic liquid such as an aliphatic or aromatic hydrocarbon, an alcohol such as ethanol, propanol, isopropanol or the like, or a ketone such as acetone, methylethyl ketone, diethyl ketone or the like and most preferably the liquid dispersing medium is aqueous. When the adhesive composition is aqueously dispersed then a cationic or anionic and/or non-ionic dispersing agent may be employed. The liquid dispersed adhesive phenoplast (modified or unmodified) compositions, in uncured or partially cured form may be applied to a substrate, which may be selected from the class consisting of plastic film, woven fabrics, non-woven fiber sheeting, and metal foil, and may be dried thereon for application as a sheet to be interposed between substrates to be joined by curing thereof. The liquid dispersed epoxy resin adhesives may be similarly applied except that they must be at least partially cured before being contacted with the m-aminophenol promoter.

SUMM 13. RFD Dips. The RF resin is preferably employed with an elastomer latex and such combination is referred to by the trade and herein as "RFL" or as an RFL dip. The elastomer latices employable in such RFL combinations include natural Hevea latex, natural rubber latices grafted with vinyl compounds such as methyl methacrylate, vinylpyridine, etc., and various synthetic rubber latices such as homopolymer latex of a C.sub.4 to C.sub.10 conjugated diene compound, and copolymer latices obtained by the copolymerization of a C.sub.4 to C.sub.10 conjugated diene with one or more vinyl monomers such as styrene, vinylpyridine, acrylonitrile, acrylic acid, methacrylic acid, alkyl acrylates and alkyl methacrylates and the like, e.g. styrene-butadiene copolymer latex, polybutadiene latex, polyisoprene latex, polychloroprene latex, isopreneisobutylene copolymer latex, butadiene-acrylonitrile copolymer latex, butadiene-methacrylic acid copolymer latex, butadiene-styrene-acrylic acid copolymer latex, and a preferred elastomer latex is a vinylpyridine latex, usually used in combination with another elastomer latex, for example as described in U.S. Pat. No. 2,561,215, herein incorporated by reference, wherein the vinylpyridine latex comprises an aqueous dispersion of a copolymer of 50 to 95 percent by weight of a conjugated diolefin having 4 to 6 carbon atoms, 5 to 40 percent of a vinylpyridine, and 0-40 percent of a styrene, and suitable vinylpyridines are 2-vinylpyridine, 2-methyl-5-vinylpyridine and 5-ethyl-2-vinylpyridine. Such a vinylpyridine latex is commercially available as "Gen-Tac," a trademark product of General Tire and Rubber Co., which is reported to be a vinylpyridine latex consisting of a copolymer of 70% butadiene, 15% styrene and 15% 2-vinylpyridine having a total solids content of around 40 percent. It is usually desirable to blend the vinylpyridine latex with an SBR rubber latex as for example a blend of 70 to 80% of an SBR rubber latex and 20 to 30% by weight of the vinylpyridine latex. The elastomer latex component of an RFL dip may

be added to a preformed RF resin as an aqueous dispersion, or the RF resin may be prepared in the presence of the elastomer latex. The RFL dip may be applied to the fibrous material or pre-treated fibrous material and be dried thereon as above described.

SUMM In a first aspect of the method category of this invention, in the formation of a bond by vulcanizing a vulcanizable elastomer to a fibrous material with the aid of an adhesive dip of resorcinol formaldehyde resin with or without a quantity of elastomer latex dried on the fibrous material before assembly with the elastomer and vulcanization thereof, which fibrous material may also have been treated with a dip of epoxy resin and dried, to improve the bond there is also applied to the fibrous material, and dried thereon before such assembly, a dip of m-aminophenol. The ratios of the coating components on the fibrous material applied as individual or combined component dips are preferably as follows: epoxy resin (dry basis) 0-2 parts by weight; resorcinol formaldehyde resin (dry basis) 1 part by weight; elastomer latex (dry basis) 0-15 parts by weight; m-aminophenol (dry basis) 0.1 to 4 parts by weight. In the single or combined component dips a quantity of water or volatile solvent is employed in such proportion that the dry solids content of the dip is preferably in the range of 0.1% to 10% by weight.

SUMM In particular procedural embodiments of the invention the adhesive dip of resorcinol-formaldehyde resin and the m-aminophenol dip may be at least in part applied to the fibrous material and dried thereon concurrently; or the adhesive dip of resorcinol formaldehyde resin and the m-aminophenol dip may be at least in part applied to the fibrous material and dried thereon sequentially; or at least a part of the m-aminophenol dip may be applied to and dried on the fibrous material after the drying thereon of the adhesive dip of resorcinol formaldehyde resin.

SUMM In an embodiment of its product aspect the invention provides a composite structure consisting essentially of a vulcanizable elastomer vulcanizate bonded to a fibrous material with the aid of an adhesive from a resorcinol formaldehyde resin dip with or without a portion of elastomer latex, particularly characterized in that the bonding of said adhesive is augmented by m-aminophenol applied to and dried on the fibrous material prior to its assembly with the elastomer and vulcanization thereof; and in another embodiment the invention provides a composite structure consisting essentially of a vulcanizable elastomer vulcanizate bonded to a fibrous material with the aid of epoxy resin adhesive and an adhesive from a resorcinol-formaldehyde resin dip with or without a portion of elastomer latex, particularly characterized in that the bonding of said adhesives is augmented by m-aminophenol applied to and dried on the fibrous material prior to its assembly with the elastomer and vulcanization thereof.

SUMM c. from 0 to 15 parts elastomer latex, and

SUMM d. from 0.1 to 4.0 parts m-aminophenol; and especially such an aqueous adhesive composition which contains as component (a) a resorcinol/formaldehyde phenoplast, and as component (c) from 0.5 to 15 parts vinyl pyridine latex, and/or which contains from 0.2 to 2.0 parts epoxy resin.

SUMM E. An improved elastomer latex composition for use in

preparing modified phenoplast adhesive compositions which consist essentially, dry basis by weight, of

- SUMM a. 15 parts elastomer latex, and
- SUMM b. from 0.1 to 4.0 parts m-aminophenol; and especially such an improved composition in which at least 0.5 parts of the elastomer latex is a vinylpyridine latex, a polychloroprene latex, a butadiene-acrylonitrile latex, a latex of polychloroprene having carboxyl substituents, or a latex of butadiene-acrylonitrile polymer having carboxyl substituents, or a combination of two or more such latices.
- SUMM (5) The RF or RFL resin as aqueous dispersion with m-aminophenol is applied to the fabric material and dried; and the resorcinol formaldehyde resin is prepared in aqueous dispersion with the aid of preferably a basic catalyst, e.g. sodium hydroxide, ammonia or the amines; and if elastomer latex is employed it can be added prior, during or after formation of the RF resin to form the RFL resin; however, the m-aminophenol to act as an adhesion promoter must be added after the RF resin or RFL resin has formed or may be added with the latex when it is added to the performed RF resin, in which case a performed mixture as set out under (E) above is an especially useful subcombination.
- SUMM The following Examples are their tabulations demonstrate applicant's discovery of the effect of m-aminophenol as an adhesive promoter in improving the bond strength between fibrous material and elastomer material when bonded with an epoxy resin and/or with a resorcinol formaldehyde resin with or without elastomer latex, in each of the above noted aspects, as indicated in connection with the respective groups or tables thereof.

SUMM TABLE IV

| Elastomer Compounding Recipes | | | |
|--|-----|-----|-----|
| Compounding Recipe | (A) | (B) | (C) |
| Polychloroprene.sup.(1) | 80 | -- | -- |
| Polychloroprene.sup.(2) | 20 | -- | -- |
| Polybutadiene-acrylonitrile.sup.(3) | -- | 100 | -- |
| Polybutadiene-styrene.sup.(4) | -- | -- | 100 |
| Phenyl-B-naphthylamine | 1 | 1 | 1 |
| Silica.sup.(5) | 30 | -- | -- |
| Carbon black.sup.(6) | -- | 25 | -- |
| Phenolic resin.sup.(7) | -- | 30 | 40 |
| Polybutadiene-acrylonitrile.sup.(8) | 15 | -- | -- |
| Stearic acid | -- | 1 | 1 |
| Polyethylene.sup.(9) | 1 | -- | -- |
| Hexamethylenetetramine | -- | 1.9 | 3.0 |
| Tetramethyl thiuram monosulfide.sup.(10) | | | |

| | | | |
|---------------------------------|----|----|-----|
| | -- | -- | 0.2 |
| Sulfur | -- | -- | 2.0 |
| Red Lead (98% Pb.sub.3 O.sub.4) | | | |
| | 10 | -- | -- |
| Cure | | | |
| Temp. 165° C. (X) | | | |
| | X | X | X |
| Time, min. | 45 | 60 | 45 |

-
- .sup.(1) Neoprene GNA - a trademark product of E. I. du Pont de Nemours and Co., Inc.
 .sup.(2) Neoprene WB - a trademark product of E. I. du Pont de Nemours and Co., Inc.
 .sup.(3) Hycar 1002 - a trademark product of B. F. Goodrich Chemical Co.
 .sup.(4) SBR-1502
 .sup.(5) Hi-Sil 233 - a trademark product of Pittsburgh Plate Glass Co.
 .sup.(6) Philblack A - a trademark product of Phillips Petroleum Co.
 .sup.(7) Durex 12686 - a trademark product of Hooker Chemical Corp.
 .sup.(8) Poly B-D resin CN-15 - a trademark product of Atlantic Richfield Co.
 .sup.(9) A/C Polyethylene 617A - a trademark product of Allied Chemical Corp.
 .sup.(10) Monex - a trademark product of Uniroyal, Inc.

SUMM Examples 36 through 41 Table VI are concerned with the adhesion of glass fiber fabric to a polychloroprene. Glass fiber fabric was first coated with an epoxy resin which was cured and then after-treated with m-aminophenol (both alone and in combination with resorcinol-formaldehyde dip) and the adhesion to polychloroprene determined.

SUMM 5. A resin dip prepared from half of the 2% stock dispersion of dip No. (2) (aged 2 hours) by adding to it an equal weight of aqueous solution of m-aminophenol in which the weight of m-aminophenol equalled the combined weights of resorcinol and m-aminophenol in the resin of dip No. (2). 6. A resin dip prepared from half of the 2% stock dispersion of dip No. (3) (aged 2 hours) by adding to it an equal weight of aqueous m-aminophenol solution in which the weight of m-aminophenol was equal to the weight of the m-aminophenol in the m-aminophenol-formaldehyde resin of dip No. (3).

SUMM The m-aminophenol to form a dip thereof may be added to the aqueous RF resin or RFL resin before drying thereof, and preferably the aqueous RF or RFL resin is essentially free of formaldehyde to avoid having such formaldehyde react with the m-aminophenol and convert it to resin, which conversion could render the m-aminophenol ineffective for the purposes of this invention.

SUMM In example 44, Table VIII an RFL dip was made as follows: 33.2 parts by weight resorcinol was dissolved in a solution of 2.6 parts sodium hydroxide in 665 parts water and then 34.4 parts 37.5% formalin was added to provide a proportion of 1.4 formaldehyde to 1 resorcinol. This dispersion was aged 11/2 hours and then combined with a mixture of 390 parts by weight of a butadiene-styrene-vinylpyridine-latex (Gen-Tac latex, a trademark product of the General Tire and Rubber Co.) of 41% solids and 30 parts of an SBR latex (Pliolite 3757E latex, a trademark product of the Goodyear tire and Rubber Co.) of 66% solids plus 70 parts water. This RFL dip was aged 24 hours before use.

- SUMM The RFL dip used in Example 44B was made from a portion of that dip from Example 44A by adding to it m-aminophenol in an amount equal to the weight of resorcinol in the RFL dip and dissolved in water equal to 1/2 the weight of RFL dip. The m-aminophenol can advantageously be combined with the elastomer latex especially with the butadiene-styrene-vinylpyridine latex (Gen-Tac latex).
- SUMM The RFL dip of Example 45A was prepared as follows: 11 parts resorcinol were added to a solution of 1.5 parts sodium hydroxide in 239 parts water, and then 16.2 parts 37.5% formalin were added to provide a proportion of 2 moles formaldehyde to 1 mole resorcinol. This dispersion was aged 21/2 hours at about 27° C. and then added to a mixture of 86 parts polychloroprene latex (Neoprene 635 latex, a trademark product of E. I. du Pont de Nemours and Co. Inc.) of 58% solids. This RFL dip was aged 1 hour before use.
- SUMM The data in Table VIII shows that when adhering polyester fabric to butadiene-styrene-vinylpyridine elastomers employing a resorcinol-formaldehyde-latex dip the addition of m-aminophenol to the dip improved the adhesion of the laminate.

SUMM

TABLE VIII

Effect of m-Aminophenol with RFL Dips on Adhesion of Modified Polyester Fibers* to SBR Compound

| Example No. | Adhesion to SBR Compound.sup.(3) | |
|-------------|--|-----------------------------|
| | RFL Dip | Peel Strength, lb./1" width |
| 44A | RFL dip.sup.(1) contained 13% by weight butadiene-vinylpyridine-styrene latex solids, 1.6% SBR latex solids, and 3.6% RF solids | |
| 44B | As in 44A except for addition of m-aminophenol in amount equal in weight to the RF resin solids in the RFL dip. | |
| 45A | RFL dip.sup.(2) contained 8.5% by weight polychloroprene latex solids, 4.2% butadiene-vinylpyridine-styrene latex solids, 4.2% SBR Latex solids and 2.9% RF solids | |
| 45B | As in 45A except for the addition of m-aminophenol equal in weight to that of RF resin in the RFL dip | |

*An adhesive-activated polyester 12.8 oz. woven fabric containing Celanese type 790 yarn in the warp and type 797 (low shrinkage equivalent yarn) in the filling.

.sup.(1) The RFL dip was prepared by first reacting 33.2 parts by weight resorcinol and 34.4 parts of 37% formalin in a solution of 2.6 parts sodium hydroxide in 665 parts water. This RF dip was aged 11/2 hours and then added to a mixture of 390 parts of Gen-Tac Latex (butadiene-styrene-vinylpyridine terpolymer). 30 pt Pliolite Latex 3757E,

66% solids and 70 pts. water. This RFL dip was aged 24 hours before use. .sup.(2) The RFL dip was prepared by first reacting 11 parts by weight resorcinol and 16.2 parts 37% formaldehyde in a solution of 1.5 parts

sodium hydroxide in 239 parts water. This RF dip was aged 21/2 hours at about 27° C. and then added to a mixture of 86 parts of Neoprene 635 latex (a polychloroprene latex of 58% solids, E. I. du Pont de Nemour and Co. Inc. 38 parts Pliolite 37457E (a 66% solids SBR latex, Goodyear Tire & Rubber Co.) and 61 parts Gen-Tac latex (a butadiene-styrene-vinylpyridine terpolymer latex of about 41% solids, General Tire and Rubber Co.) and 141 parts water. This dip was aged 1 hour before use.

.sup.(3) 100 SBR 1502, 50 HAF black, 3 zinc oxide, 1 stearic acid, 1 Santocure NS (n-tert-butyl-2 benzothiozole sulfonamide, Monsanto Co.) 1.7 sulfur, 1 Wingstay 100 (mixed diaryl paraphenylenediamines) Goodyear Tire and Rubber Co. Fabric-elastomer laminate cured 45 min./165° C.

- SUMM The data in Table X shows the adhesion of Dacron to SBR, employing epoxy coatings at least in part cured to the Dacron with heat and with or without the aid of curative material and with a further coating of RFL dip dried thereon, and improved by applying m-aminophenol prior to the RFL dip or in admixture with the RFL dip and drying the same before assembly with the vulcanizable elastomer and vulcanization thereof.
- SUMM Example 52 is concerned with the adhesion of the polyester fabric Dacron to a polychloroprene compound and demonstrates the effect of a m-aminophenol aqueous dip as an after-treatment applied to fabric previously treated with an aqueous dip containing epoxy resin, m-aminophenol, RF resin, and an elastomer latex and cured. The aqueous epoxy-RFL dip was prepared as follows:
- SUMM To the RF resin dispersion was added 12.2 parts by weight of a butadiene-styrene-vinylpyridine terpolymer latex (Gen-Tac) diluted with water to contain 5 parts solids and also an emulsion containing 1% DGEBA resin solids (Araldite 6020) and m-aminophenol in the amount of 16 parts by weight per hundred parts epoxy resin.
- SUMM The data in Table XI shows that the bond between Dacron and Neoprene, adhered with the aid of an aqueous emulsion of epoxy resin and resorcinol-formaldehyde resin containing m-aminophenol of at least partially cured on the Dacron before assembly with the Neoprene and vulcanization thereof, is improved by an after-treatment with m-aminophenol dried thereon prior to the assembly with the Neoprene and vulcanization thereof.

SUMM

TABLE XI

ADHESION OF POLYESTER FABRIC TO POLYCHLOROPRENE
Effect of After-Treatment with m-Aminophenol on Polyester Fabric
Pre-Treated with
Combination of Epoxy Resin Emulsion, m-Aminophenol, and RFL

Dip

Bonded to
Polychloroprene

Example

Fabric* Treatment A

Fabric Treatment B

Compound** and Tested

| No. | Dry Heat | Dry Peel Strength, lb./1" width |
|-----|---|---------------------------------|
| 52A | An aqueous emulsion of 0.79% total solids 16 hr./ 60 min./ consisting of approximately 30% epoxy 27° C. 165° C. -- -- 31 resin.sup.(1) solids, 30% RF resin.sup.(2) solids, 30% elastomer as latex solids.sup.(3), 4.8% m-aminophenol, and 6% emulsifier.sup.(4) | |
| 52B | Same as 54A above " " 0.5% aqueous 16 hr./ 41 m-aminophenol 27° C. | |

*"Dacron" polyethylene terephthalate - a trademark product of E. I. du Pont de Nemours and Co. Inc.

**Compound recipe A, Table IV and cured 60 minutes at 165° C.

.sup.(1) Araldite 6020, a trademark product of Ciba Products Co. See recipe I, Table I-A.

.sup.(2) See footnote 2, Table VI.

.sup.(3) Gen-Tac latex - a terpolymer of styrene, vinylpyridine and butadiene, a trademark product of General Tire & Rubber Co.

.sup.(4) Equal parts by weight of polyoxyethylene sorbitan monostearate ("Tween 60", Atlas Chemical Industries) and Duponol ME (a lauryl alcohol sulfate, E. I. du Pont de Nemours & Co. Inc.

SUMM The latex to which the m-aminophenol was added was a mixture of a butadiene-vinylpyridine-styrene terpolymer latex (Gen-Tac latex, General Tire and Rubber Company) and an SBR latex (Pliolite 3757E, Goodyear Tire and Rubber Co.) in the ratio of 5 parts vinylpyridine-terpolymer latex solids to 1 part SBR latex solids. The m-aminophenol was added to the butadiene-vinylpyridine-styrene-latex.

SUMM This mixture of latices was divided into four portions of 150 g., each containing 60 g. solids. To the first (control) portion 100 g. pure water was added, while to the second portion 3 g. m-aminophenol dissolved in 97 g. water were added. Similarly to the third portion were added 6 g. m-aminophenol dissolved in 94 g. water, and to the fourth portion 12 g. m-aminophenol dissolved in 88 g. water. These latex mixtures were allowed to stand for 11/2 hours before 150 g. of an alkaline RF dispersion containing 12 g. RF resin solids (of 1:2 resorcinol-formaldehyde molar ratio) were added to each. This RF resin dispersion had been aged 11/2 hours before addition to the latex mixture. The RFL mixture thus obtained was aged for 1 hour before treatment of the polyester fabric by dipping pieces of it into each of the four RFL dips, respectively.

SUMM The four treated polyester fabrics were hung up to dry at room temperature overnight then were heated 10 minutes at 115° C. They were then formed into laminates with an SBR compound in a Carver press and then the laminates were cured 60 minutes at 165° C. and specimens were cut from the cured laminates and were tested for peel strength. The results of these tests are presented in Table XIII and show that for bonding a fabric material to an elastomer using an RFL

dip, when m-aminophenol is added to the elastomer latex which is combined with an aqueous dispersion of a resorcinol-formaldehyde resin then better adhesion is obtained than when the elastomer latex of such RFL dip does not contain added m-aminophenol.

SUMM Similarly, in practicing Example 45B, the m-aminophenol may be added to one or more of the elastomer latices, e.g. the polychloroprene latex, the butadienestyrene latex, and the butadiene-styrene-vinylpyridine latex, and the thus improved latex composition can be used in forming the improved RFL dip. Preferably the m-aminophenol is combined with the vinylpyridine polymer latex, in the ratio of about 10 parts m-aminophenol per 15 parts latex, dry basis, and this combination used in the proportions set out in Example 45B provides the designated quantity of m-aminophenol based on the RF resin.

SUMM

TABLE XIII

Effect of m-Aminophenol in Latex used in RFL Dips as
Adhesive for Modified Polyester Fabric to SBR Elastomer

| Compound | | Adhesion to an SBR *Compound of Modified Polyester Fabric Treated with RFL Dips | | |
|----------------|--|--|----------------------|--------------------------------|
| Example No. | Composition of RFL Dips | Dispersion | | |
| | Latex Mixture | RF Resin.sup.(1) solids (laminates cured 60 min./165° C.) | Parts by wt. pphr | Peel Strength, lb./1" width |
| 55A | 125 parts vinylpyridine terpolymer latex.sup.(2) (50 solids) 26 parts SBR latex (10 solids) 100 parts water | 150 (12 solids) | 20 | 29 |
| 55B | 125 parts vinylpyridine terpolymer latex.sup.(3) (50 solids) 25 parts SBR latex.sup.(3) (10 solids) 3 parts m-aminophenol (5 phr) 97 parts water | 150 (12 solids) | 20 | 37 |
| 56A | 125 parts vinylpyridine terpolymer latex.sup.(2) (50 solids) 25 parts SBR latex.sup.(3) (10 solids) 6 parts m-aminophenol (10 phr) 94 parts water | 150 (12 solids) | 20 | 38 |
| 56B | 125 parts vinylpyridine terpolymer latex.sup.(2) (50 solids) 25 parts SBR latex.sup.(3) (10 solids) 12 parts m-aminophenol (20 phr) 88 parts water | 150 (12 solids) | 20 | 39 |

*100 SBR 1502, 50 HAF black (Philblack O, Phillips Petroleum Co.),
 1,2,2'-methylene bis(4-methyl-6-tertiary-butylphenol) (Antioxidant 2246,
 American Cyanamid Co.), 3 zinc oxide, 2 sulfur,
 1.25 N-oxydiethylene
 benzothiazole-2-sulfonamide (Nobs Special, American Cyanamid Co.).
 **Celanese type 790 "adhesive activated" polyester was used as warp in
 this fabric while type 797 (low shrinkage equivalent) was used in filling
 .sup.(1) The RF resin was prepared in one master solution for all seven
 dips as follows: 53.8 g. resorcinol was dissolved in 420 g. 1% NaOH, then
 79 g. of 37.5% formalin and 497 g. water were added, after which the
 dispersion was aged for 11/2 hours before addition to the latex
 mixture.
 The RFL mixture was aged 1 hour before use.
 .sup.(2) Gen-Tac latex, General Tire and Rubber Co.
 .sup.(3) Pliolite 3757E, Goodyear Tire and Rubber Co. (Reduced to 40%
 solids).

SUMM Examples 57 and 58 demonstrate the improved adhesion between polyester
 and an SBR compound obtained by adding m-aminophenol to the second dip
 of a 2-dip commercial type fabric treatment in which the first dip was a
 dispersion containing a blocked diisocyanate and an epoxy resin, while
 the second was an RFL dip containing vinylpyridine terpolymer
 latex.

SUMM The basic RFL dip of these examples was prepared as follows: 11 parts by
 weight resorcinol was combined with 320.5 parts water, 0.3 parts sodium
 hydroxide, and 16.2 parts 37% formalin and this mixture was allowed to
 age for six hours before combination with 250 parts 40% vinylpyridine
 terpolymer latex (Gen-Tac, General Tire and Rubber Co.) and
 11.3 parts 28% ammonium hydroxide. This dip was divided in half and to
 one half 5 parts m-aminophenol dissolved in 100 parts water were added.

SUMM

TABLE XIV

ADHESION OF POLYESTER FABRIC.^{sup.}(1) TO SBR

Improvement of Adhesive Strength by Addition of m-Aminophenol to Second
 Dip
 of a Two-Dip Commercial Adhesive Fabric Treatment

| | | | | Adhesion to SBR. ^{sup.} (3) Compound (laminates cured 60 min./165° C.) |
|---------|---------------------------|----------------|--------------------------------|--|
| Example | Fabric Dip I | Dry | Fabric Dip II | |
| No. | | | Dry Heat Peel Strength, lb./1" | |
| | | | | width |
| 57 | 5% solids dispersion of | 3.6 parts | | |
| | | 6 hr./ | 20% solids | |
| | | | 17 hr./ | |
| | | | 30 min./ | |
| | | | | 23 |
| | blocked diisocyanate* and | | | |
| | | 27° C. | | |
| | | | RFL dip (2) | |
| | | | 27° C. | |
| | | | 165° C. | |
| | 1.36 parts epoxy resin** | | | |
| | | 5 min./115° C. | | |
| 58 | 5% solids dispersion of | | | |

6 hr./ 20% solids RFL
 17 hr.
 30 min./
 35

3.6 parts blocked diisocyanate*
 27° C.
 dip.sup.(2) + 5
 27° C.
 165° C.

and 1.36 parts epoxy resin**
 5 min./ parts m-amino-
 115° C.
 phenol per 8.5
 parts RF resin

*Bis phenol adduct of methylene bis-(4-phenyl isocyanate) Hylene MP, E. I. du Pont de Nemours and Co. Inc.

**Epon 812, Shell Chemical Co.

.sup.(1) Dacron, E. I. du Pont de Nemours & Co., Inc.

.sup.(2) Prepared so as to contain 100 parts vinylpyridine terpolymer latex solids (Gen-Tac, General Tire and Rubber Co.), 17.3 parts RF resin

(made with 0.3 parts sodium hydroxide catalyst and aged 6 hours) and 11.3 parts 28% ammonium hydroxide.

.sup.(3) 100 SBR 1502

1,2,2',2'-methylene-bis(4-methyl-6-tertiary-butyl-phenol) (antioxidant 2246, American Cyanamid Co.) 50 HAF black (Philblack O, Phillips Petroleum Co.) 3 zinc oxide, 2 sulfur 1.25 N-oxidiethylene benzothiazole-2-sulfonamide (Nobs Special, American Cyanamid Co.)

SUMM Examples 59 and 60 demonstrate the effect on adhesion of adding m-aminophenol to RFL dispersions in which the RF resin was made in the presence of the latex (Gen-Tac, a vinylpyridine terpolymer latex produced by General Tire and Rubber Co.). This RFL dip was prepared as follows: 11 parts resorcinol was dissolved in a solution of 0.3 parts sodium hydroxide in 130 parts water and added to 250 parts Gen-Tac latex containing about 100 parts polymer solids then was added 16.3 parts 37% formalin in 191 parts water and the mixture was aged at 27° C. for 21/2 hours. Then 11.3 parts 28% ammonium hydroxide was added and the dispersion was allowed to stand for another half hour before use.

SUMM

TABLE XV

RFL DIPS IN WHICH RF RESIN WAS FORMED IN PRESENCE OF LATEX

Effect of Addition of m-Aminophenol on Adhesion of Modified Polyester Fabric to SBR Compound**

| Example | | Adhesion to SBR Compound Laminates cured 60 min./165 | |
|---------|--|--|---------------------------------|
| No. | RFL Dip | Drying of Fabric | Peel Strength, lb./in. width |
| 59 | 17 parts RF resin formed in presence of 100 parts pyridine terpolymer latex.sup.(1) (2) (dry basis) | 16 hr. at 27° C. 32 10 min. at 115° C. | |

- 60 As in Example 59 except for the addition of 5 parts
 16 hr. at 27° C.
 42
 m-aminophenol per 8.5 parts RF resin .sup.(2)
 10 min. at 115° C.

*An adhesive-activated polyester 12.8 oz. woven fabric containing Celanese type 790 yarn in the warp end type 797 (low shrinkage equivalent yarn) in the filling.

**See Table XIV for compounding recipe.

.sup.(1) The latex used was Gen-Tac, General Tire and Rubber Co.

.sup.(2) The RFL dip was prepared as follows: 11 parts resorcinol was dissolved in a solution of 0.3 parts sodium hydroxide in 130 parts water and added to 250 parts Gen-Tac latex containing 100 parts polymer solids,

16,3 parts 37% formalin in 191 parts water was then added and this mixture was aged 21 1/2 hours at 27° C. after which 11.3 parts of 28% ammonium hydroxide was added and the dispersion was aged for another half hour. It was then divided into 2 equal portions to the first of which (Example 59) 100 parts plain water were added, while to the second (Example 60) were added 5 parts m-aminophenol dissolved in 95 parts water

SUMM A mill-mixed polychloroprene masterbatch consisting of 100 parts Neoprene AC (E. I. du Pont de Nemours and Co. Inc.), 2 parts phenyl-alpha-naphthylamine, 4 parts magnesium oxide, and 5 parts zinc oxide was added to a solution of 45 parts heat reactive phenolic resin (Bakelite CKM-1634, Union Carbide Corporation) dissolved in 431 parts toluene. Four additional parts magnesium oxide were also added and the mixture was ballmilled for 24 hours, then one part water was added and the cement was ball-milled for another hour.

SUMM

TABLE XVII

Adhesion of Wood to Wood and of Aluminum to Wood
 Improvement of Adhesion by Addition of m-Aminophenol to Polychloroprene Cements

| Example No. | Adhesive Formulation (parts by weight) | Aging of Laminates (days/27° C.) | Lap Shear Strength | |
|-------------|---|-------------------------------------|--------------------|------------------------|
| | | | Wood-Wood (psi) | Aluminum-Wood (psi) |
| 63 | Base formulation (100 Neoprene AC*, 2-phenol-alpha-naphthylamine, 8 magnesium oxide, 5 zinc oxide, 45 Bakelite CKM-1634**, 431 toluene) plus 32 MEK | 5 | 262 | |
| 64 | base formulation (above) plus 11 m-aminophenol in 44 MEK | 5 | 298 | |
| 65 | Base formulation (above) plus 22.5 m-aminophenol in 90 MEK | 5 | 411 | |
| 66 | Base formulation (above) plus 32 MK | 12 | | 397 |
| 67 | Base formulation (above) plus 11 m-aminophenol in 44 MEK | 12 | | 423 |
| 68 | Base formulation (above) plus 22.5 m-aminophenol | | | |

in 90 MEK

12

>427.sup.(1)

*E. I. du Pont de Nemours and Co. Inc.

**Union Carbide Corporation.

.sup.(1) Testing machine was stopped because stress exceeded its capacity

SUMM Examples 69 and 70 are concerned with supported adhesive films prepared by dipping filter paper into RFL dips containing vinylpyridine terpolymer latex, and demonstrate the improved adhesion obtained by after-treating the dried films by dipping them into a dilute solution of m-aminophenol.

SUMM The RFL dip was prepared as follows: 12.8 parts resorcinol were dissolved in 100 parts aqueous 1% sodium hydroxide, and then 19 parts 37% formalin were added. This mixture was aged for 30 minutes and then 250 parts Gen-Tac latex (General Tire and Rubber Co.) were added to it and the combination was aged for two hours before use. Strips of filter paper were then dipped into the RFL dip and dried at about 27° C. After about 24 hours one of the strips was dipped into a 0.5% solution of m-aminophenol in MEK and re-dried.

SUMM

TABLE XVIII

Adhesion of Wood to Wood with RFL Films on Paper Support
Improvement of Adhesion by After-Treatment of Film with

m-Aminophenol

Cure of Laminate

Lap Shear Tensile

Example

Preparation of Supported Adhesive Films

Area of Film

min./° C.

lb. lb./sq.in.

69 Filter paper dipped into RFL dip* containing vinyl-
.0276 sq. in.
60/160 80 2900
pyridine terpolymer latex and 20 phr RF resin and
(circle)

dried at 27° C.

70 As above plus after-treatment of the dried films in
.0276 sq. in.
60/160 >100**
>3600**
dip of 0.5% m-aminophenol in MEK
(circle)

*12.8 parts resorcinol were dissolved in 100 parts aqueous sodium hydroxide, and then 19 parts 37% formalin were added. This mixture was aged for 30 minutes and then 250 parts Gen-Tac latex (General Tire and

Rubber Co.) containing 100 parts solids were added to it and the combination was aged 2 hours before use.

**Test was stopped short of failure of adhesive because stress exceeded capacity of the testing machine.

SUMM In Examples 71 through 74 an RFL adhesive dip containing polychloroprene latex was absorbed on both paper and nylon fabric supports and

dried, after which portions of the treated paper and fabric were further treated by being dipped into dilute solutions of m-aminophenol.

SUMM The basic RFL dip was prepared as follows: 12.8 parts resorcinol were dissolved in 100 parts aqueous sodium hydroxide and then 19 parts 37% formalin were added. The solution was aged 30 minutes and then added to 172 parts Neoprene 635 latex (E. I. du Pont de Nemours and Co. Inc.) containing 100 parts solids. After this mixture had aged for two hours, a strip of filter paper and a strip of nylon fabric were each dipped into it and dried at about 27° C. These furnished the tapes for Examples 71 and 73. Portions of the treated paper and fabric were then dipped into a 0.5% solution of m-aminophenol in MEK and re-dried. These furnished the tapes for Examples 72 and 74.

SUMM

TABLE XIX

RFL Adhesives on Paper and Nylon Fabric Supports
Improvement of Adhesion by After-Treatment with m-Aminophenol

| Example | Preparation of Supported Adhesive | Area of Adhesion | Cure of Laminate | Lap Shear Tensile | |
|---------|---|------------------|------------------|-------------------|---------|
| | | | | min./° C. | lb. PSI |
| 71 | Filter paper was dipped into RFL dip* containing 0.25 sq.in. Aluminum polychloroprene latex and 20 parts RF resin and dried (square) at 27° C | | 60/160 | 70 | 280 |
| 72 | As above plus after-dip of 1/2% m-aminophenol in MEK 0.25 sq. in. Aluminum (square) | | 60/160 | 88 | 350 |
| 73 | Nylon 66 fabric was dipped into RFL dip* containing .0276 sq. in. Wood polychloroprene latex and 20 parts RF resin and (circle) dried at 27°. | | 60/160 | 54 | 1950 |
| 74 | As above plus after-dip of 1/2% m-aminophenol in MEK .0276 sq. in. Wood (circle) | | 60/160 | 70 | 2500 |

*12.8 parts resorcinol were dissolved in 100 parts aqueous sodium hydroxide and then 19 parts 37% formalin were added. The solution was aged 30 minutes and then added to 172 parts Neoprene 635 latex (E. I. du Pont de Nemours & Co. Inc.) containing 100 parts solids. This mixture was aged for 2 hours before use.

SUMM A mill-mixed polychloroprene masterbatch containing 100 parts Neoprene

AC (E. I. du Pont de Nemours & Co. Inc.) 2 parts phenylalpha-naphthylamine, 4 parts magnesium oxide, and 5 parts zinc oxide was dissolved in 360 parts toluene. To this was added a combination of 50 parts modified Novolac resin (Durez 12686, Hooker Chemical Corporation) dissolved in an equal weight of acetone and 4.1 parts hexamethylenetetramine dissolved in 47 parts chloroform. The cement was then divided into two equal portions, to the first of which (Examples 75 and 77) was added 50 parts acetone while to the second (Examples 76 and 78) m-aminophenol in 37.5 parts acetone.

SUMM

TABLE XX

 Phenol-Polychloroprene Adhesives on Nylon Film and Aluminum Foil

Supports

Improvement of Wood to Wood Adhesion by Addition of m-Aminophenol to Adhesive

| Example No. | Preparation of Supported Adhesive | Cure of Laminate | Lap Shear Tensile | |
|-------------|---|------------------|-------------------|-------|
| | | | Adherends | |
| | Area of Adhesion | (min./° C.) | (lbs.) | (psi) |
| | | | | |
| 75 | Nylon 6 film was painted on both sides with .0276 sq. in. polychloroprene-phenolic cement* (circle) | Wood 60/160 | 63 | 2280 |
| 76 | Nylon 6 film was painted with polychloroprene 0.276 sq. in. phenolic cement as above except for addition (circle) of 25 parts m-aminophenol per hundred rubber* | Wood 60/160 | 77 | 2800 |
| 77 | Aluminum foil (1. mil) was painted on both 0.276 sq. in. sides with polychloroprene-phenold cement*. (circle) | Wood 55/180 | 88 | 3180 |
| 78 | Aluminum foil (1.0 mil) was painted with 0.276 sq. in. polychloroprene-phenolic cement as above except for additin of 25 parts m-aminophenol per hundred rubber.* | Wood 55/180 | 96 | 3480 |

*A mill-mixed polychloroprene masterbatch containing 100 parts Neoprene A (E. I. du Pont de Nemours & Co. Inc.) 2 parts phenyl-alpha naphthylamine, 4 parts magnesium oxide and 5 parts zinc oxide was dissolved in 360 parts toluene. To this was added a combination of 50 parts modified Novolac resin (Durez 12686, Hooker Chemical Corporation) dissolved in an equal weight of acetone and 4.1 parts hexamethylenetetramine dissolved in 47 parts chloroform. The cement was then divided into 2 equal portions, to the first of which (Examples 75 and 77) was added 50 parts acetone while to the second (Example 76 and 78) was added a solution of 12.5 parts m-aminophenol in 37.5 parts acetone.

SUMM The adhesive tapes were prepared as follows: 19.4 parts Penocolite R-2170 (a 75% aqueous solution of resorcinol formaldehyde thermoplastic resin, Koppers Co. Inc.) were diluted with 120 parts 1% aqueous sodium hydroxide, and then 2.4 parts hexamethylenetetramine dissolved in 158 parts water were added. This solution was then divided into 2 equal portions, to one of which 125 parts (50 parts solids) Gen-Tac Latex (General Tire and Rubber Co.) were added, while to the other were added 117 parts (50 parts solids) Chemigum 245-CH5 (butadiene-acrylonitrile latex, Goodyear Tire And Rubber Co.).

SUMM

TABLE XXI

Thermosetting RFL Adhesives on Paper Support
Improvement of Adhesion by After-Treatment of Tapes with

m-Aminophenol
Example

Cure of Laminate
Lap Shear Tensile

No. Preparation of Supported Adhesive

Area of Adhesion

Adherends

(min./° C.)

(Lb.)

(psi)

| | |
|----|--|
| 79 | Strips of filter paper were dipped into RFL .0276 sq. in. wood 60/160 82 2970 dip* containing vinylpyridine latex, and (circle) were dried at about 27° C. |
| 80 | A portion of treated paper from Example 79 .276 sq. in. wood 60/160 96 3480 was after-treated in dip of 0.5% m-aminophenol (circle) in acetone |
| 81 | Strips of filter paper were dipped into RFL .0276 sq. in. wood 60/160 75 2715 dip* containing butadiene-acrylonitrile (circle) latex and were dried at 27° C. |
| 82 | A portion of treated paper from Example 81 .0276 sq. in. wood 60/160 87 3150 was after-treated in dip of 0.5% (circle) m-aminophenol in acetone |

*19.4 parts Penocolite R-2170 (75% aqueous solution of resorcinol-formaldehyde thermoplastic resin, Koppers Co. Inc.) were diluted with 120 parts 1% aqueous sodium hydroxide, and then 2.4 parts hexamethylenetetramine dissolved in 15 parts water were added. This solution was then divided into two equal portions to one of which 125 parts (50 parts solids) Gen-Tac latex (General Tire and Rubber Co.) were added, while to the other were added 117 parts (50 parts solids) Chemigum 245-CH5 (butadiene-acrylonitrile latex, Goodyear Tire and Rubber

Co.).

SUMM The cement of Example 85 was prepared by adding to a portion of that of Example 84 glacial acetic acid in the amount of 50 parts per hundred phenolic resin, which was sufficient to render the solution definitely acid (about pH 5.0).

SUMM

TABLE XXII

Phenolic-Polyamide-Polychloroprene Adhesives on Paper Support
Improvement of Wood-to-Wood Adhesion by Addition of m-Aminophenol

| Example No. | Preparation of Supported Adhesive | Area of Adhesion | Adherends | Cure of | Lap Shear | Tensile Strength |
|-------------|---|------------------|-----------|-------------|-----------|------------------|
| | | | | Laminate | | |
| | | | | (min./° C.) | (lbs.) | (psi) |
| <hr/> | | | | | | |
| 83 | Strip of filter paper painted on both sides with phenolic-polyamide- | .0276 sq.in. | Wood | 60/160** | 55 | 1990 |
| | (circle) | | | | | |
| | polychloroprene cement* and dried at 27° C. | | | | | |
| 84 | Strip of filter paper painted on both sides with cement as above* except | .0276 sq. in | Wood | 60/160** | 75 | 2715 |
| | (circle) | | | | | |
| | for addition of m-aminophenol in the amount of 50 parts per hundred resin as a 20% solution in methyl ethyl ketone | | | | | |
| 85 | Strip of filter paper painted on both sides with cement as in Example 84 | .0276 sq. in. | Wood | 60/160** | 71 | 2570 |
| | (circle) | | | | | |
| | except for the addition of glacial acetic acid in the amount of 50 parts per hundred resin, which acidified the solution to about pH 5.0. | | | | | |

*4 parts of a polyamide resin (Versamid 115, General Mills Inc.) and 4 parts thermoplastic phenolic resin (Durez 22193, Hooker Chemical Corp.) were dissolved in 32 parts toluene. To this was added 24 parts of a 25% solution of polychloroprene (Neopreme AC, E. I. du Pont de Nemours & Co., Inc.) in toluene.

**Followed by cooling under pressure to 80° C. before opening press.

SUMM Examples 88 and 89 demonstrate improvement of adhesion obtained by adding m-aminophenol to RFL dips containing a carboxyl-modified butadiene-acrylonitrile elastomer latex where the RFL dips

were used in the preparation of papersupported adhesive tapes.

SUMM In preparing the RFL-dips, 12.8 parts resorcinol were dissolved in 100 parts 1% aqueous sodium hydroxide solution, then 19 parts 37% formalin were added and this mixture was allowed to age for 21/2 hours at about 27° C. before the addition of 150 parts carboxyl-modified NBR latex (Hycar 1570 X 20, B. F. Goodrich Chemical Co.) containing 60 parts solids. This dip was then divided into two equal portions, to the first of which (Example 88) were added 50 parts water, while to the second (Example 89) was added a solution of 3 parts m-aminophenol in 47 parts water.

SUMM

TABLE XXIV

Carboxyl-Modified NBR Latex in RFL Adhesive on Paper Support
Improvement of Adhesion by Addition of m-Aminophenol to RFL

Dip

| Example | Area of | Cure of | Lap Shear |
|---------|-----------------------------------|-------------|------------------|
| No. | Preparation of Supported Adhesive | Laminates | Tensile Strength |
| | Adhesion | Adherends | |
| | | (min./° C.) | |
| | | (lbs.) | |
| | | (psi) | |

| | | | |
|----|---|----|------|
| 88 | Filter paper dipped in mixture of 141 parts RFL dip** | | |
| | .0276 Wood 60/160 | 73 | 2640 |

(containing 30 parts carboxyl-modified NBR rubber and
sq. in
10 parts RF resin) and 50 parts water, then dried 24
(circle)
hours at about 21° C.

| | | | |
|----|---|----|------|
| 89 | Filter paper dipped in mixture of 141 parts RFL dip** | | |
| | .0276 sq.in. | 81 | 2940 |
| | Wood 60/160 | | |

(containing 30 parts carboxyl-modified NBR rubber and
(circle)
10 parts RF resin) and a solution of 3 parts m-amino-
phenol in 47 parts warm water, then dried 24 hours at
about 21° C.

**A resorcinol-formaldehyde (RF) resin was prepared by dissolving 12.8 parts resorcinol in 100 parts 1% aqueous sodium hydroxide solution, and adding 19 parts 37% formalin. This was allowed to age for 21/2 hours, the 150 parts carboxyl-modified NBR latex (Hycar 1570 + 20, B. F. Goodrich Chemical Co.) were added.

CLM What is claimed is:
10. An aqueous adhesive composition comprising a mixture, dispersed in the aqueous phase, dry basis by weight, of a. 1 part phenoplast resin, b. from 0 to 2 parts epoxy resin, c. from 0 to 15 parts elastomer latex and d. from 0.2 to 4.0 parts m-aminophenol.

CLM What is claimed is:

11. An aqueous adhesive composition as claimed in claim 10, said composition comprising a mixture, dispersed in the aqueous phase, dry basis by weight, of a. 1 part resorcinol-formaldehyde resin, b. from 0 to 2 parts epoxy resin, c. from 0.5 to 15 parts vinylpyridine latex, and d. from 0.2 to 4.0 parts m-aminophenol.

CLM What is claimed is:

12. An aqueous adhesive composition as claimed in claim 10, comprising a mixture dispersed in the aqueous phase, dry basis by weight, of a. 1 part phenoplast resin, b. from 0.2 to 2 parts epoxy resin, c. from 0 to 15 parts elastomer latex, and d. from 0.2 to 4.0 parts m-aminophenol.

CLM What is claimed is:

13. An aqueous adhesive composition as claimed in claim 10, said composition comprising a mixture, dispersed in the aqueous phase, dry basis by weight, of a. 1 part resorcinol-formaldehyde resin, b. from 0.2 to 2 parts epoxy resin, c. from 0.5 to 15 parts vinylpyridine latex, and d. from 0.2 to 4.0 parts m-aminophenol.

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L18 ANSWER 9 OF 15 USPATFULL on STN

ACCESSION NUMBER: 82:25402 USPATFULL

TITLE: Blend of a carboxylated copolymer latex and of an acrylate copolymer latex for coating rubber and product

INVENTOR(S): Kuan, Tiong H., Stow, OH, United States

PATENT ASSIGNEE(S): The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|---------------------|---------------------|------|--------------|
| PATENT INFORMATION: | US 4331738 | | 19820525 |
| APPLICATION INFO.: | US 1980-212788 | | 19801204 (6) |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Morgenstern, Norman | | |
| ASSISTANT EXAMINER: | Childs, S. L. | | |
| NUMBER OF CLAIMS: | 8 | | |
| EXEMPLARY CLAIM: | 1,5 | | |
| LINE COUNT: | 705 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI Blend of a carboxylated copolymer latex and of an acrylate copolymer latex for coating rubber and product

AB A composition of a blend of a carboxylated copolymer latex having a Tg of not less than about -30° C. such as a copolymer of styrene, itaconic and methacrylic acids and butadiene-1,3 and an acrylate copolymer latex having a Tg of not less than about +30° C. such as a copolymer of ethylacrylate, methyl methacrylate and acrylamide containing a minor amount by weight of a heat sensitizer sufficient to gel the composition and which also can contain fillers, wetting agents and stabilizers, and so forth can be used to provide a water resistant film on the surface of a hot rubber compound or composition which subsequently can be cooled rapidly with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

SUMM In U.S. Pat. No. 4,217,395 and U.S. copending patent application Ser.

No. 093,771 filed Nov. 13, 1979 now abandoned there is disclosed a process for preventing the surfaces of a hot, sticky rubber compound from sticking together by coating them with a water resistant, heat sensitized carboxylated copolymer latex composition so that the rubber can be cooled with water, dried and stacked in layers without sticking together. This improves the production of rubber compounds from a Banbury and the handling of these compounds in factory operations. These carboxylated copolymer compositions generally contain fillers such as clay which may produce dusting on drying and handling. Reduction in the filler to avoid dusting may impair the release properties of the coating.

SUMM According to the present invention it has been found that a blend of a carboxylated copolymer latex and an acrylate copolymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the polymer particles of the latices on the application of heat, preferably containing also fillers, stabilizers and wetting agents, can be used, to form an adherent water resistant coating on a hot rubber surface which subsequently can be water cooled, by dipping, preferably by spraying, dried and assembled without danger of the rubber (layers) sticking to itself. The film formed on heat drying resists removal by water spray. Film formation is believed due to the heat from the freshly mixed (milled or worked) rubber. The film is adherent to the rubber and prevents layers of rubber from sticking together. Also, any filler in the rubber latex is effectively bound by the carboxylated and acrylate polymers on drying so that dusting does not occur to any appreciable extent when a filler is present in the coating and so that clean-up problems are reduced. In fact, a feature of the present composition and method is that a reduced amount of filler can be used with achievement of satisfactory results. The use of the present process, also, provides a method for increasing the production of a Banbury.

SUMM The carboxylated copolymer is prepared by free radical aqueous emulsion copolymerization. It should be capable of forming an essentially non-tacky, essentially water insoluble film when cast as a latex and dried, and the copolymer per se should be sulfur vulcanizable and have a glass transition temperature (T_g) of not less than about -30° C. The carboxylated copolymer contains (1) at least 45% by weight of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methylmethacrylate, or ethyl methacrylate or mixture thereof, (2) up to 10% by weight of a copolymerizable acidic monomer like acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid or crotonic acid or mixture thereof, and (3) the balance a copolymerizable conjugated diene monomer in sufficient amount by weight to afford some flexibility and to provide for vulcanization, crosslinking or curing, e.g., sulfur, or peroxide curing, such as butadiene-1,3, isoprene, 2,3-dimethylbutadiene-1,3, or piperylene or mixture thereof. Very minor amounts of a 4th, 5th etc., monomer such as methyl acrylate, hydroxy ethyl acrylate, and so forth can be copolymerized with the above monomers so long as these additional monomers do not adversely affect the properties of the resulting carboxylated copolymer, the latex blend and/or the rubber compound to which the blend is applied. Methods for making carboxylated polymers are disclosed in U.S. Pat. Nos. 2,604,668; 2,669,550; 2,710,292; 2,724,707; 2,849,426; 2,868,754; 3,392,048; 3,404,116; 3,409,569 and 3,468,833; in "Rubber World," September, 1954, pages 784 to 788; and in "Industrial and Engineering Chemistry," May, 1955, pages 1006 to 1012. Mixtures of

carboxylated latices may be used. While an ester of the acid or its anhydride etc., can be copolymerized instead of the acid and then hydrolyzed and neutralized to form free acid groups in the copolymer, this procedure is not as convenient as directly copolymerizing the acidic monomer with the other copolymerizable monomers.

SUMM The acrylate polymer, also, is prepared by free radical aqueous solution copolymerization. It should be capable of forming an essentially non-tacky, essentially water insoluble film when cast with the carboxylated copolymer as a latex blend and dried on the substrate. The acrylate copolymer should have a glass transition temperature (T_g) of not less than about +30° C. The acrylate copolymer comprises a copolymer of (1) from about 50 to 70% by weight of at least one acrylate selected from the group consisting of methyl acrylate and ethyl acrylate, (2) from about 25 to 40% by weight of at least one alkacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate and methyl ethacrylate and (3) from about 3 to 7% by weight of acrylamide. Very minor amounts of another monomer(s) may be copolymerized with these monomers provided it does not adversely affect the properties of the resulting acrylate copolymer, the latex blend and/or the rubber compound to which the blend is applied. This acrylate copolymer alone as a slab dip does not provide adequate flexibility.

SUMM In the latex blend, on a dry weight basis, the carboxylated copolymer is used in an amount of from about 50 to 85% by weight and the acrylate copolymer is used in an amount of from about 50 to 15% by weight.

SUMM NaOH, KOH, NH₄ OH and so forth may be added to the polymerization reactor before, during or after polymerization to control the pH as desired. Polymerization may be conducted under acidic conditions.

SUMM The water should be free of deleterious materials, and preferably should be distilled or ion exchanged. Sufficient water is used to enable formation of the emulsion and to enable proper mixing or stirring of the ingredients during polymerization to obtain the desired rate and degree of polymerization, heat transfer and so forth. The solids content (after removal of water) of the resulting latex, thus, may vary from about 25 to 50% by weight, and the pH can be from about 7.5 to 11.5.

SUMM While the above blend of the carboxylated copolymer latex and the acrylate copolymer latex can be used alone for the dip, it is preferred to employ a compounded latex blend. In other words, it is preferred to compound the latex blend with rubber fillers or extending agents along with the desired rubber stabilizers including chelating and/or sequestering agents, wetting or dispersing agents, suspending agents, defoamers, antisticking agents, antioxidants, bactericides, and the like to provide a stable, filled, compounded latex blend composition which has good covering power and which provides a nontacky, nonsticky or releasable, but adherent coating, film and/or layer on a hot tacky rubbery substrate when dried. Some latex compounding ingredients are shown by "Materials, Compounding Ingredients and Machinery for Rubber," "Rubber World" publication, 1977, Bill Communications, Inc., New York.

SUMM The fillers which are desirably added to the latex blend to extend it are nonblack, inorganic rubber compounding pigments or fillers. The fillers, also, may help as antisticking agents and may

serve to thicken the latex as well as to modify the viscosity of the latex. The filler should be finely divided. Examples of fillers are calcium carbonate, clay, precipitated hydrated silica, fumed silica, mica, barytes, perlite, magnesium silicate or talc, feldspar, hydrous calcium magnesium silicate, magnesium carbonate, magnesium oxide, titanium dioxide, and the like and mixtures of the same. Of the materials it is preferred to use calcium carbonate, clay, fumed silica or hydrated precipitated silica and mixtures thereof. These fillers are used in an amount necessary to provide the desired extension, thickening, viscosity and/or additional antisticking properties for the latex and to reduce cost. Too large an amount should be avoided since the rubber particles of the latex (rubber dispersion or suspension) blend on drying will not be present in sufficient amount to form a film and to bind all of the filler particles together to the substrate. In general the amount of filler can vary from about 100 to 1,000 parts by weight per 100 parts by weight total of dry copolymers (from the latex blend).

SUMM The other, as mentioned above, latex compounding ingredients (besides the pigments) are used in a minor amount by weight as compared to the copolymers (dry basis). They are desired (for example, in addition to any stabilizers, emulsifiers etc., used during polymerization) to further stabilize the latex blend in view of the addition of the fillers. These other compounding ingredients may provide more than one function in the latex, e.g., they may act as dispersing agents as well as wetting agents. In general, these other compounding ingredients such as stabilizers and wetting agents are used in an amount of from about 1 to 30 parts by weight per 100 parts by weight total of the copolymers of the latex blend on a dry basis. Examples of some of these other latex compounding ingredients are, if needed, anti-foaming or defoaming agents such as polyalkylene-ether glycols, triols and tetrols, 2,4,7,9-tetramethyl-5-decyn-4,7-diol, Defoamer Y-250 (blend of emulsifiable mineral oil, silica derivatives and esters, Drew Chemical Corp.), and the like. Examples of some stabilizing, dispersing and wetting agents are sodium linoleate, octylphenoxy polyethoxy ethanol, polyoxypropylene oxyethylene glycol, casein, alkyl aryl sulfonates, sodium dioctyl sulfosuccinate, sodium salt of polymerized alkyl naphthalene sulfonate, sodium stearate, and nonyl phenol and the like and mixtures thereof. Examples of some suspending and organic thickening agents are ammonium polyacrylate, sodium polyacrylate, hydroxyethyl cellulose, potassium alginate, polysaccharides, sodium alginate and the like and mixtures thereof. Examples of some antisticking agents are zinc stearate, saponified fatty acids and so forth.

SUMM The heat sensitizer is required so that the blend of the latices of the copolymers will form a film (coagulate or gel) at the desired temperature, e.g., on contacting the hot rubber stock. The heat sensitizer, also, acts to form (accelerate) a stronger film faster at a given temperature and thus reduces time of processing. Examples of heat sensitizers are the zinc amine system, polyvinyl methyl ether, polypropylene glycol, 2-nitro-2-methyl-1-propanol and so forth. Polyoxypropylene oxyethylene glycols and similar alkylene oxide polyols, also, may act as heat sensitizers. The heat sensitizer is used in a minor amount by weight dry as compared to the polymer of the latex sufficient to gel or coagulate the polymers. Preferably, there are used about 0.75 to 15 parts by weight of the sensitizer to 100 parts by weight total of the copolymers in the latex blend on a dry weight basis. Mixtures of heat sensitizers can be used.

- SUMM Minor amounts by weight of latices of other polymers and copolymers may be added to the latex blend of the carboxylated copolymer and the acrylate copolymer provided they do not adversely affect the properties of the carboxylated copolymer latex, the acrylate copolymer latex, the latex blend of the carboxylated copolymer and acrylate copolymer and/or the rubber stock which is treated with the latex blend.
- SUMM For more information on methods of compounding and treating latex or latices see "Latex In Industry," Noble, 2nd Ed. 1953, Rubber Age, Palmerton Publishing Co., New York and "High Polymer Latices," Blackley, 1966, Vols. 1 and 2, Maclauren & Sons Ltd., London.
- SUMM The amount of water used in making or added to the compounded latex will depend on the desired viscosity, handling characteristics of the compounded latex, the thickness of the film which it is desired to lay down on the rubber substrate and the time required for drying and film formation. Thin films and low viscosity compounded latices are desirable; however, these properties may vary considerably with needs, coating equipment, storing, pumping, speeds of coating, drying times and temperatures, film thickness and so forth. In general, the total solids content in the aqueous compounded latex blend may be from about 7 to 75%, preferably from about 7 to 40%, by weight. Deionized or distilled water should be used as the diluent to avoid introducing extraneous ions which might cause instability to the latex, resulting film and so forth.
- SUMM The compounded aqueous latex blend dip may be applied to the rubber substrate by dipping, spraying, roller coating, painting or by any means which will provide a suitable coating. Thin coatings are preferred since they will gel and dry in a short time. On the other hand, while thick coatings may be used, only the surface layers nearest to or adjacent the rubber stock may be gelled in sufficient time so that the bulk of the coating may be washed off during the subsequent water (spray or dip) cooling step. Moreover, excess dip coating may require further compounding of the rubber stock itself to overcome the effects of the dip coating if the rubber compound is further mixed with curing agents such as sulfur and rubber accelerators. In general, not over about 7%, preferably not over about 2%, by weight dry of the dried latex composition from the dip on the rubber stock substrate will be enough to prevent sticking.
- SUMM While the dip of the present invention can be applied to any polymeric surface and heated to prevent sticking of the surfaces, it is particularly applicable to rubber stocks which have been Banburied, masticated, milled or which are freshly mixed and hot so that their surfaces are sticky or tacky. The stocks may be in the form of milled, masticated or broken down rubber, partially or fully compounded with carbon black, zinc oxide, stearic acid, silica, extender oil, styrenated phenol antioxidant, sulfur, and so forth. Examples of the rubber polymers which may be used in the stocks are natural rubber, polyisoprene, polybutadiene, butadiene-styrene copolymer, butadiene-acrylonitrile copolymer, butadiene styrene-acrylonitrile copolymer, butadiene-acrylic ester copolymer, polychloroprene, ethylene-propylene-nonconjugated diene copolymers (EPDM), isobutylene-isoprene copolymers (butyl), chlorinated butyl, brominated butyl and the like and mixtures thereof. While the process of the present invention is particularly useful for treating hot rubber which has just been Banburied and passed through a sheeting mill to form

a continuous hot sheet or slab, it will be appreciated that it can apply to any milled, extruded, calendered, laminated or warmed, tacky rubber stocks to prevent the rubber stocks from sticking together when piled, shelved or stored awaiting subsequent processing, e.g., in the manufacture of tires, belts and so forth. Moreover, while the dip of the present invention is useful with slab, strip or sheet rubber stock, especially in continuous form, it, also, can be used on separate pieces, formed or not, or in the form of powders, pellets, crumb or particles and so forth to prevent them from sticking together.

SUMM As an illustration of the use of the present invention the hot (about 90°-150° C.) masticated rubber stock from the Banbury is passed through a sheeting mill to form a continuous hot sheet or slab and the continuous hot slab is dipped in a dip tank containing the latex blend slab dip composition of this invention for about 1 second or so and is then allowed to air dry for 30 to 60 seconds or until at least about 80% of the water has evaporated (preferably all the water should evaporate) and the heat sensitizer in the latex has caused the copolymers in the latex blend to coagulate or gel. Excess dip should be drained or removed to avoid formation of a film which may retain water. The gelled latex composition coated slab is then sprayed with water for about 30 to 40 seconds to cool it down without removing the latex blend coating composition and then air dried and stacked at a lay down temperature of about 50° C. maximum, preferably of about 45° C. maximum, (to prevent scorch) to form stacks or layers of rubber which do not stick together. During the air drying step and/or the water spraying step the rubber sheet or slab may be carried on a series of rotating shafts with long loops between the shafts (festooned) to save space. Water spraying is a more efficient method of cooling rubber stocks than air cooling. With increased cooling capability, the throughput of mixed rubber stocks can be increased substantially without scorching.

SUMM Since the blend of the carboxylated copolymer latex and the acrylate copolymer latex may be sensitive to extraneous ions such as metallic cations which may cause it to coagulate or cause the precipitation of soaps, the dipping tank and piping, stirrers, pumps and so forth which may be used in connection with a dip tank should preferably contain a protective coating such as an epoxy resin, glass etc. and chelators and/or sequestering agents should preferably be added to the latex blend dip etc. Examples of chelating or sequestering agents are ethylene diamine tetraacetic acid and the hydrates, hydrated esters and ammonium, sodium and calcium-sodium salts thereof. The chelating agent may be used in an amount of from about 0.25 to 1.75 parts per 100 parts by weight total of the carboxylated copolymer and the acrylate copolymer on a dry weight basis. If stirring or agitating means are available and used continuously or when needed, filler suspending agents for the filled latex may not be necessary. The slab dip should not be subjected to extremes of temperature and evaporation during storage to avoid coagulation.

DETD The following slab dip formulation was prepared:

| Ingredient | Parts by Weight | | % |
|------------------------------|-----------------|-----|-------------|
| | Wet | Dry | (Wet Total) |
| Carboxylated copolymer latex | 15 | 7.5 | 1.80 |

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| | | | |
|------------------------------------|--------|----------|--------|
| Acrylate copolymer latex | 5.1 | 2.55 | 0.61 |
| Clay | 30.0 | 30.0 | 7.20 |
| Zinc Stearate | 0.2 | 0.2 | 0.048 |
| TRITON-CF-32 (95% solids in water) | 1.02 | 1.0 | 0.24 |
| SEQUESTRENE NA-3 | 0.1 | 0.1 | 0.024 |
| TAMOL 960 (40% solids in water) | 0.25 | 0.1 | 0.024 |
| 2-NMP | 0.2 | 0.2 | 0.048 |
| Water | 364.63 | (374.85) | 90.0 |
| Total | 416.5 | 41.65 | 99.994 |

DETD

Cumulative Time, minutes

Addition of Ingredients

| | |
|----|--|
| 0 | Water, Carboxylated copolymer latex, TRITON CF-32, TAMOL 960, 2-NMP, and SEQUESTRENE NA-3 (stir mixture) |
| 2 | Acrylate copolymer latex (continue stirring) |
| 10 | Clay and Zinc Stearate |

DETD Then the hot freshly milled rubber samples were dipped in a bath of the above latex slab dip composition for about 1 second, dried in air at about 25° C. for about 60 seconds, cooled in a water spray at about 25° C. for 30 seconds, and then dried in air for 60 seconds and stacked.

DETD 3. Effect of Dip on Vulcanizate Properties

DETD Properly remilled rubber samples or stocks containing the slab dip (B) were examined for Mooney viscosity #, stress-strain properties and Monsanto fatigue. The results are shown in Table III, below. The calculated and theoretical F ratios at 95% confidence levels are also included in the table. When the calculated F ratio is more than twice the theoretical value, the event is significant. Based on this consideration, the dip does not cause any change in the properties of the rubber vulcanizates.

DETD

TABLE III

Effect of Dip On Vulcanizate Properties

| Property | F Ratio | | | | Data Table | |
|----------|---|--|---------------------------------|------------------------------|------------|--|
| | Control (No Dip) Mean Value | With Above Calcu- Slab Dip (B) σ | lated Based Mean Value | From Statis- On tical* | | |
| | | | | | | |

| | | | | | | |
|--------------------------|------|------|------|------|------|------|
| ML-1 + 4 at 100° C. # | | | | | | |
| | 62 | | 63 | -- | -- | |
| Shore A | 68 | | 67 | -- | -- | |
| 10% Modulus (MPa) | 0.39 | 0.02 | 0.40 | 0.01 | 2.33 | 6.61 |

| | | | | | | |
|--|-------|------|-------|------|-------|-------------------------------|
| 100% Modulus (MPa) | 2.33 | 0.05 | 2.35 | 0.06 | 0.13 | 6.61 |
| 300% Modulus (MPa) | 9.22 | 0.13 | 8.95 | 0.07 | 13.09 | 6.61 |
| Tensile (MPa) | 19.81 | 0.45 | 19.47 | 0.27 | 1.37 | 6.61 |
| Elongation (%) | 576.7 | 14.5 | 594.0 | 17.3 | 1.96 | 6.61 |
| Monsanto fatigue to 100% ϵ , kc | 223.3 | 63.5 | 307.7 | 72.9 | 3.80 | 5.32 |
| | | | | | | (v.sub.1 = 1, v.sub.2 = 8) |

*v.sub.1 = 1, v.sub.2 = 5; v = degrees of freedom; 95%

MPa -- Mega Pascals

σ -- standard deviation

- DETD Carboxylated copolymer latex--Aqueous emulsion free radical polymerized high molecular weight copolymer of about 64% by weight of styrene, about 2% by weight total of a mixture of itaconic acid and methacrylic acid, and the balance butadiene-1,3. About 50% by weight solids, pH of 9. Brookfield LVF viscosity #2 spindle @ 60 rpm of 60 to 90. Tg of about -15.9° C. by Differential Thermal Analysis and Tg of about -10.2° C. by Differential Scanning Calorimetry.
- DETD Acrylate copolymer latex--Aqueous emulsion polymerized copolymer of about 65% by weight of ethylacrylate, about 30% by weight of methyl methacrylate and about 5% by weight of acrylamide. Contains synthetic anionic emulsifier. About 50.5% solids. pH of 2.5. Tg of +45° C. Brookfield Viscosity (centipoises) Spindle No. 1, 60 rpm, of 140.
- DETD TRITON CF-32--Amine polyglycol condensate, nonionic, cloud point of 25° C., pH of 10. Low foam emulsifier and stabilizer. Rohm and Haas Co.
- DETD TAMOL 960--Sodium salt of a carboxylated acrylic polymer, pH of 7.0. Dispersing agent. Rohm and Haas Co.
- CLM What is claimed is:
1. The method which comprises coating a hot, sticky rubber compound with a heat sensitized aqueous polymer composition comprising a blend of two latices, drying said coated rubber compound until at least 80% of the water has evaporated to form a gelled, non-tacky, water resistant and adherent polymeric coating from said composition on said rubber compound, cooling said coated rubber compound with water and drying the same to a temperature sufficiently low to prevent scorch of said rubber compound and stacking said coated rubber compound to provide layers of said rubber compound which do not stick together, (A) the polymer of one of said latices of said composition comprising a carboxylated copolymer of (1) at least 45% by weight of a monomer selected from the group consisting of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methyl methacrylate and ethyl methacrylate and mixtures thereof, (2) a copolymerizable monomer selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid and crotonic acid and mixtures thereof in an amount of up to 10% by weight and (3) the balance, in an amount sufficient to provide some flexibility to and for vulcanization of said copolymer, a copolymerizable monomer selected from the group consisting of butadiene-1,3,

isoprene, 2,3-dimethyl-butadiene-1,3 and piperylene and mixtures thereof, said copolymer of (A) having a glass transition temperature of not less than about -30°C. ; and (B) the polymer of the other of said latices of said composition consisting essentially of a copolymer of (1) from about 50 to 70% by weight of at least one acrylate selected from the group consisting of methyl acrylate and ethyl acrylate, (2) from about 25 to 40% by weight of at least one alkacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate and methyl ethacrylate and (3) from about 3 to 7% by weight of acrylamide, said copolymer of (B) having a glass transition temperature of not less than about $+30^{\circ}\text{C.}$, the parts by weight ratio of the copolymer of (A) to the copolymer of (B) being from about 50:50 to 85:15 on a dry weight basis.

CLM

What is claimed is:

2. The method which comprises coating a hot, milled sticky rubber compound with a heat sensitized aqueous compounded polymer composition comprising a blend of two latices, drying said coated rubber compound to form a gelled, non-tacky, water resistant and adherent polymeric coating from said composition on said rubber compound, the amount of said coating being not over about 7% by weight of said rubber compound, cooling said coated rubber compound with water and drying the same to a temperature not above about 50°C. , and stacking said coated rubber compound to provide layers of said rubber compound which do not stick together, (A) the polymer of one of said latices of said composition comprising a carboxylated copolymer of (1) at least 45% by weight of a monomer selected from the group consisting of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methyl methacrylate and ethyl methacrylate and mixtures thereof, (2) a copolymerizable monomer selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid and crotonic acid and mixtures thereof in an amount of up to 10% by weight and (3) the balance, in an amount sufficient to provide some flexibility to and for vulcanization of said copolymer, a copolymerizable monomer selected from the group consisting of butadiene-1,3, isoprene, 2,3-dimethyl-butadiene-1,3 and piperylene and mixtures thereof, said copolymer of (A) having a glass transition temperature of not less than about -30°C. , and (B) the polymer of the other of said latices of said composition consisting essentially of a copolymer of (1) from about 50 to 70% by weight of at least one acrylate selected from the group consisting of methyl acrylate and ethyl acrylate, (2) from about 25 to 40% by weight of at least one alkacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate and methyl ethacrylate and (3) from about 3 to 7% by weight of acrylamide, said copolymer of (B) having a glass transition temperature of not less than about $+30^{\circ}\text{C.}$, the parts by weight ratio of the copolymer of (A) to the copolymer of (B) being from about 50:50 to 85:15 on a dry weight basis, said compounded polymer composition containing, based on 100 parts by weight total dry of the copolymer of (A) and the copolymer of (B), from about 100 to 1000 parts by weight of inorganic, non-black rubber compounding pigments, from about 1 to 30 parts by weight of stabilizers and wetting agents, from about 0.75 to 15 parts by weight of a heat sensitizer and from about 0.25 to 1.75 parts by weight of a chelating agent, and the total solids content of said composition being from about 7 to 75% by weight.

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L18 ANSWER 8 OF 15 USPATFULL on STN

ACCESSION NUMBER: 82:49700 USPATFULL
TITLE: Rubber slab dip
INVENTOR(S): Kuan, Tiong H., Stow, OH, United States
PATENT ASSIGNEE(S): The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4354001 | | 19821012 |
| APPLICATION INFO.: | US 1981-332689 | | 19811221 (6) |
| RELATED APPLN. INFO.: | Division of Ser. No. US 1980-212788, filed on 4 Dec 1980, now patented, Pat. No. US 4331738 | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Schofer, Joseph L. | | |
| ASSISTANT EXAMINER: | Sarofim, N. | | |
| NUMBER OF CLAIMS: | 3 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 649 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

AB A composition of a blend of a carboxylated copolymer latex and an acrylate copolymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the composition and which also can contain fillers, wetting agents and stabilizers, and so forth can be used to provide a water resistant film on the surface of a hot rubber compound or composition which subsequently can be cooled rapidly with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.

SUMM In U.S. Pat. No. 4,217,395 and U.S. copending patent application Ser. No. 093,771 filed Nov. 13, 1979, now abandoned there is disclosed a process for preventing the surfaces of a hot, sticky rubber compound from sticking together by coating them with a water resistant, heat sensitized carboxylated copolymer latex composition so that the rubber can be cooled with water, dried and stacked in layers without sticking together. This improves the production of rubber compounds from a Banbury and the handling of these compounds in factory operations. These carboxylated copolymer compositions generally contain fillers such as clay which may produce dusting on drying and handling. Reduction in the filler to avoid dusting may impair the release properties of the coating.

SUMM According to the present invention it has been found that a blend of a carboxylated copolymer latex and an acrylate copolymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the polymer particles of the latices on the application of heat, preferably containing also fillers, stabilizers and wetting agents, can be used, to form an adherent water resistant coating on a hot rubber surface which subsequently can be water cooled, by dipping, preferably by spraying, dried and assembled without danger of the rubber (layers) sticking to itself. The film formed on heat drying resists removal by water spray. Film formation is believed due to the heat from the freshly mixed (milled or worked) rubber. The film is adherent to the rubber and prevents layers of rubber from sticking together. Also, any filler in the rubber latex is effectively bound by the carboxylated and acrylate polymers on drying so that dusting does not occur to any appreciable extent when a filler is present in the coating and so that clean-up problems are reduced. In

fact, a feature of the present composition and method is that a reduced amount of filler can be used with achievement of satisfactory results. The use of the present process, also, provides a method for increasing the production of a Banbury.

SUMM The carboxylated copolymer is prepared by free radical aqueous emulsion copolymerization. It should be capable of forming an essentially non-tacky, essentially water insoluble film when cast as a latex and dried, and the copolymer per se should be sulfur vulcanizable and have a glass transition temperature (T_g) of not less than about -30° C. The carboxylated copolymer contains (1) at least 54% by weight of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methylmethacrylate, or ethyl methacrylate or mixture thereof. (2) up to 10% by weight of a copolymerizable acidic monomer like acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid or crotonic acid or mixture thereof, and (3) the balance a copolymerizable conjugated diene monomer in sufficient amount by weight to afford some flexibility and to provide for vulcanization, crosslinking or curing, e.g., sulfur, or peroxide curing, such as butadiene-1,3, isoprene, 2,3-dimethylbutadiene-1,3, or piperylene or mixture thereof. Very minor amounts of a 4th, 5th etc., monomer such as methyl acrylate, hydroxy ethyl acrylate, and so forth can be copolymerized with the above monomers so long as these additional monomers do not adversely affect the properties of the resulting carboxylated copolymer, the latex blend and/or the rubber compound to which the blend is applied. Methods for making carboxylated polymers are disclosed in U.S. Pat. Nos. 2,604,668; 2,669,550; 2,710,292; 2,724,707; 2,849,426; 2,868,754; 3,392,048; 3,404,116; 3,409,569 and 3,468,833; in "Rubber World," September 1954, pages 784 to 788; and in "Industrial and Engineering Chemistry," May, 1955, pages 1006 to 1012. Mixtures of carboxylated latices may be used. While an ester of the acid or its anhydride etc., can be copolymerized instead of the acid and then hydrolyzed and neutralized to form free acid groups in the copolymer, this procedure is not as convenient as directly copolymerizing the acidic monomer with the other copolymerizable monomers.

SUMM The acrylate polymer, also, is prepared by free radical aqueous emulsion copolymerization. It should be capable of forming an essentially non-tacky, essentially water insoluble film when cast with the carboxylated copolymer as a latex blend and dried on the substrate. The acrylate copolymer should have a glass transition temperature (T_g) of not less than about +30° C. The acrylate copolymer comprises a copolymer of (1) from about 50 to 70% by weight of at least one acrylate selected from the group consisting of methyl acrylate and ethyl acrylate, (2) from about 25 to 40% by weight of at least one alkacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate and methyl ethacrylate and (3) from about 3 to 7% by weight of acrylamide. Very minor amounts of another monomer(s) may be copolymerized with these monomers provided it does not adversely affect the properties of the resulting acrylate copolymer, the latex blend and/or the rubber compound to which the blend is applied. This acrylate copolymer alone as a slab dip does not provide adequate flexibility.

SUMM In the latex blend, on a dry weight basis, the carboxylated copolymer is used in an amount of from about 50 to 85% by weight and the acrylate copolymer is used in an amount of from about 50 to 15% by weight.

- SUMM NaOH, KOH, NH₄ OH and so forth may be added to the polymerization reactor before, during or after polymerization to control the pH as desired. Polymerization may be conducted under acidic conditions.
- SUMM The water should be free of deleterious materials, and preferably should be distilled or ion exchanged. Sufficient water is used to enable formation of the emulsion and to enable proper mixing or stirring of the ingredients during polymerization to obtain the desired rate and degree of polymerization, heat transfer and so forth. The solids content (after removal of water) of the resulting latex, thus, may vary from about 25 to 50% by weight, and the pH can be from about 7.5 to 11.5.
- SUMM While the above blend of the carboxylated copolymer latex and the acrylate copolymer latex can be used alone for the dip, it is preferred to employ a compounded latex blend. In other words, it is preferred to compound the latex blend with rubber fillers or extending agents along with the desired rubber stabilizers including chelating and/or sequestering agents, wetting or dispersing agents, suspending agents, defoamers, antisticking agents, antioxidants, bactericides, and the like to provide a stable, filled, compounded latex blend composition which has good covering power and which provides a nontacky, nonsticky or releasable, but adherent coating, film and/or layer on a hot tacky rubbery substrate when dried. Some latex compounding ingredients are shown by "Materials, Compounding Ingredients and Machinery for Rubber," "Rubber World" publication, 1977, Bill Communications, Inc., New York.
- SUMM The fillers which are desirably added to the latex blend to extend it are nonblack, inorganic rubber compounding pigments or fillers. The fillers, also, may help as antisticking agents and may serve to thicken the latex as well as to modify the viscosity of the latex. The filler should be finely divided. Examples of fillers are calcium carbonate, clay, precipitated hydrated silica, fumed silica, mica, barytes, perlite, magnesium silicate or talc, feldspar, hydrous calcium magnesium silicate, magnesium carbonate, magnesium oxide, titanium dioxide, and the like and mixtures of the same. Of these materials it is preferred to use calcium carbonate, clay, fumed silica or hydrated precipitated silica and mixtures thereof. These fillers are used in an amount necessary to provide the desired extension, thickening, viscosity and/or additional antisticking properties for the latex and to reduce cost. Too large an amount should be avoided since the rubber particles of the latex (rubber dispersion or suspension) blend on drying will not be present in sufficient amount to form a film and to bind all of the filler particles together to the substrate. In general the amount of filler can vary from about 100 to 1,000 parts by weight per 100 parts by weight total of dry copolymers (from the latex blend).
- SUMM The other, as mentioned above, latex compounding ingredients (besides the pigments) are used in a minor amount by weight as compared to the copolymers (dry basis). They are desired (for example, in addition to any stabilizers, emulsifiers etc., used during polymerization) to further stabilize the latex blend in view of the addition of the fillers. These other compounding ingredients may provide more than one function in the latex, e.g., they may act as dispersing agents as well as wetting agents. In general, these other compounding ingredients such as stabilizers and wetting agents are used in an amount of from about 1 to 30 parts by weight per 100 parts by

weight total of the copolymers of the latex blend on a dry basis. Examples of some of these other latex compounding ingredients are, if needed, anti-foaming or defoaming agents such as polyalkylene-ether glycols, triols and tetrols, 2,4,7,9-tetramethyl-5-decyn-4, 7-diol, Defoamer Y-250 (blend of emulsifiable mineral oil, silica derivatives and esters, Drew Chemical Corp.), and the like. Examples of some stabilizing, dispersing and wetting agents are sodium linoleate, octylphenoxy polyethoxy ethanol, polyoxypropylene oxyethylene glycol, casein, alkyl aryl sulfonates, sodium dioctyl sulfosuccinate, sodium salt of polymerized alkyl naphthalene sulfonate, sodium stearate, and nonyl phenol and the like and mixtures thereof. Examples of some suspending and organic thickening agents are ammonium polyacrylate, sodium polyacrylate, hydroxyethyl cellulose, potassium alginate, polysaccharides, sodium alginate and the like and mixtures thereof. Examples of some antisticking agents are zinc stearate, saponified fatty acids and so forth.

SUMM The heat sensitizer is required so that the blend of the latices of the copolymers will form a film (coagulate or gel) at the desired temperature, e.g., on contacting the hot rubber stock. The heat sensitizer, also, acts to form (accelerate) a stronger film faster at a given temperature and thus reduces time of processing. Examples of heat sensitizers are the zinc amine system, polyvinyl methyl ether, polypropylene glycol, 2-nitro-2-methyl-1-propanol and so forth. Polyoxypropylene oxyethylene glycols and similar alkylene oxide polyols, also, may act as heat sensitizers. The heat sensitizer is used in a minor amount by weight dry as compared to the polymer of the latex sufficient to gel or coagulate the polymers. Preferably, there are used about 0.75 to 15 parts by weight of the sensitizer to 100 parts by weight total of the copolymers in the latex blend on a dry weight basis. Mixtures of heat sensitizers can be used.

SUMM Minor amounts by weight of latices of other polymers and copolymers may be added to the latex blend of the carboxylated copolymer and the acrylate copolymer provided they do not adversely affect the properties of the carboxylated copolymer latex, the acrylate copolymer latex, the latex blend of the carboxylated copolymer and acrylate copolymer and/or the rubber stock which is treated with the latex blend.

SUMM For more information on methods of compounding and treating latex or latices see "Latex In Industry," Noble, 2nd Ed. 1953, Rubber Age, Palmerton Publishing Co., New York and "High Polymer Latices," Blackley, 1966, Vols. 1 and 2, MacLauren and Sons Ltd., London.

SUMM The amount of water used in making or added to the compounded latex will depend on the desired viscosity, handling characteristics of the compounded latex, the thickness of the film which it is desired to lay down on the rubber substrate and the time required for drying and film formation. Thin films and low viscosity compounded latices are desirable; however, these properties may vary considerably with needs, coating equipment, storing, pumping, speeds of coating, drying times and temperatures, film thickness and so forth. In general, the total solids content in the aqueous compounded latex blend may be from about 7 to 75%, preferably from about 7 to 40%, by weight. Deionized or distilled water should be used as the diluent to avoid introducing extraneous ions which might cause instability to the latex, resulting film and so forth.

SUMM The compounded aqueous latex blend dip may be applied to the rubber substrate by dipping, spraying, roller coating, painting or by any means which will provide a suitable coating. Thin coatings are preferred since they will gel and dry in a short time. On the other hand, while thick coatings may be used, only the surface layers nearest to or adjacent the rubber stock may be gelled in sufficient time so that the bulk of the coating may be washed off during the subsequent water (spray or dip) cooling step. Moreover, excess dip coating may require further compounding of the rubber stock itself to overcome the effects of the dip coating if the rubber compound is further mixed with curing agents such as sulfur and rubber accelerators. In general, not over about 7%, preferably not over about 2%, by weight dry of the dried latex composition from the dip on the rubber stock substrate will be enough to prevent sticking.

SUMM While the dip of the present invention can be applied to any polymeric surface and heated to prevent sticking of the surfaces, it is particularly applicable to rubber stocks which have been Banburyed, masticated, milled or which are freshly mixed and hot so that their surfaces are sticky or tacky. The stocks may be in the form of milled, masticated or broken down rubber, partially or fully compounded with carbon black, zinc oxide, stearic acid, silica, extender oil, styrenated phenol antioxidant, sulfur, and so forth. Examples of the rubber polymers which may be used in the stocks are natural rubber, polyisoprene, polybutadiene, butadiene-styrene copolymer, butadiene-acrylonitrile copolymer, butadiene styrene-acrylonitrile copolymer, butadiene-acrylic ester copolymer, polychloroprene, ethylene-propylene-nonconjugated diene copolymers (EPDM), isobutylene-isoprene copolymers (butyl), chlorinated butyl, brominated butyl and the like and mixtures thereof. While the process of the present invention is particularly useful for treating hot rubber which has just been Banburyed and passed through a sheeting mill to form a continuous hot sheet or slab, it will be appreciated that it can apply to any milled, extruded, calendered, laminated or warmed, tacky rubber stocks to prevent the rubber stocks from sticking together when piled, shelved or stored awaiting subsequent processing, e.g., in the manufacture of tires, belts and so forth. Moreover, while the dip of the present invention is useful with slab, strip or sheet rubber stock, especially in continuous form, it also, can be used on separate pieces, formed or not, or in the form of powders, pellets, crumb or particles and so forth to prevent them from sticking together.

SUMM As an illustration of the use of the present invention the hot (about 90°-150° C.) masticated rubber stock from the Banbury is passed through a sheeting mill to form a continuous hot sheet or slab and the continuous hot slab is dipped in a dip tank containing the latex blend slab dip composition of this invention for about 1 second or so and is then allowed to air dry for 30 to 60 seconds or until at least about 80% of the water has evaporated (preferably all the water should evaporate) and the heat sensitizer in the latex has caused the copolymers in the latex blend to coagulate or gel. Excess dip should be drained or removed to avoid formation of a film which may retain water. The gelled latex composition coated slab is then sprayed with water for about 30 to 40 seconds to cool it down without removing the latex blend coating composition and then air dried and stacked at a lay down temperature of about 50° C. maximum, preferably of about 45° C. maximum, (to prevent scorch) to form stacks or layers of rubber which do not stick together. During the air drying step and/or the water spraying step the rubber sheet or slab may be carried on a series of rotating

shafts with long loops between the shafts (festooned) to save space. Water spraying is a more efficient method of cooling rubber stocks than air cooling. With increased cooling capability, the throughput of mixed rubber stocks can be increased substantially without scorching.

SUMM Since the blend of the carboxylated copolymer latex and the acrylate copolymer latex may be sensitive to extraneous ions such as metallic cations which may cause it to coagulate or cause the precipitation of soaps, the dipping tank and piping, stirrers, pumps and so forth which may be used in connection with a dip tank should preferably contain a protective coating such as an epoxy resin, glass etc. and chelators and/or sequestering agents should preferably be added to the latex blend dip etc. Examples of chelating or sequestering agents are ethylene diamine tetraacetic acid and the hydrates, hydrated esters and ammonium, sodium and calcium-sodium salts thereof. The chelating agent may be used in an amount of from about 0.25 to 1.75 parts per 100 parts by weight total of the carboxylated copolymer and the acrylate copolymer on a dry weight basis. If stirring or agitating means are available and used continuously or when needed, filler suspending agents for the filled latex may not be necessary. The slab dip should not be subjected to extremes of temperature and evaporation during storage to avoid coagulation.

DETD The following slab dip formulation was prepared:

| Ingredient | Parts by Weight | | % (Wet Total) |
|---------------------------------------|-----------------|----------|------------------|
| | Wet | Dry | |
| Carboxylated copolymer latex | 15 | 7.5 | 1.80 |
| Acrylate copolymer latex | 5.1 | 2.55 | 0.61 |
| Clay | 30.0 | 30.0 | 7.20 |
| Zinc Stearate | 0.2 | 0.2 | 0.048 |
| TRITON CF-32 (95% solids in water) | 1.02 | 1.0 | 0.24 |
| SEQUESTRENE NA-3 | 0.1 | 0.1 | 0.024 |
| TAMOL 960 (40% solids in water) | 0.25 | 0.1 | 0.024 |
| 2-NMP | 0.2 | 0.2 | 0.048 |
| Water | 364.63 | (374.85) | 90.0 |
| Total | 416.5 | 41.65 | 99.994 |

DETD

Cumulative Time, minutes

Addition of Ingredients

| | |
|----|--|
| 0 | Water, Carboxylated copolymer latex, TRITON CF-32, TAMOL 960, 2-NMP, and SEQUESTRENE NA-3 (stir mixture) |
| 2 | Acrylate copolymer latex (continue stirring) |
| 10 | Clay and Zinc Stearate |

DETD Then the hot freshly milled rubber samples were dipped in a bath of the

above latex slab dip composition for about 1 second, dried in air at about 25° C. for about 60 seconds, cooled in a water spray at about 25° C. for 30 seconds, and then dried in air for 60 seconds and stacked.

DETD 3. Effect of Dip on Vulcanizate Properties

DETD Properly remilled rubber samples or stocks containing the slab dip (B) were examined for Mooney viscosity #, stress-strain properties and Monsanto fatigue. The results are shown in Table III, below. The calculated and theoretical F ratios at 95% confidence levels are also included in the table. When the calculated F ratio is more than twice the theoretical value, the event is significant. Based on this consideration, the dip does not cause any change in the properties of the rubber vulcanizates.

DETD TABLE III

Effect of Dip On Vulcanizate Properties

| Effect of Dip on Vulcanizate Properties | | | | | | |
|---|-------------------------------|----------|-----------------------|----------|-------------------------------|--------------|
| Control (No Dip) | With Above Slab Dip (B) | | F Ratio Calculated | | From | Statistical* |
| Property | Mean Value | σ | Mean Value | σ | Based On Data Table | |
| <hr/> | | | | | | |
| ML-1 + 4 at 100° C. # | 62 | | 63 | | -- | -- |
| Shore A | 68 | | 67 | | -- | -- |
| 10% Modulus (MPa) | 0.39 | 0.02 | 0.40 | 0.01 | 2.33 | 6.61 |
| 100% Modulus (MPa) | 2.33 | 0.05 | 2.35 | 0.06 | 0.13 | 6.61 |
| 300% Modulus (MPa) | 9.22 | 0.13 | 8.95 | 0.07 | 13.09 | 6.61 |
| Tensile (MPa) | 19.81 | 0.45 | 19.47 | 0.27 | 1.37 | 6.61 |
| Elongation (%) | 576.7 | 14.5 | 594.0 | 17.3 | 1.96 | 6.61 |
| Monsanto fatigue to 100% | 223.3 | 63.5 | 307.7 | 72.9 | 3.80 | 5.32 |
| ϵ , kc | | | | | (v.sub.1 = 1, v.sub.2 = 8) | |

*v.sub.1 = 1, v.sub.2 = 5; v = degrees of freedom; 95%

MPa Mega Pascals

σ standard deviation

DETD Carboxylated copolymer latex: Aqueous emulsion free radical polymerized high molecular weight copolymer of about 64% by weight of styrene, about 2% by weight total of a mixture of itaconic acid and methacrylic acid, and the balance butadiene-1,3. About 50% by weight

solids, pH of 9. Brookfield LVF viscosity #2 spindle @ 60 rpm of 60 to 90. Tg of about -15.9° C. by Differential Thermal Analysis and Tg of about -10.2° C. by Differential Scanning Calorimetry.

DETD Acrylate copolymer latex: Aqueous emulsion polymerized copolymer of about 65% by weight of ethylacrylate, about 30% by weight of methyl methacrylate and about 5% by weight of acrylamide. Contains synthetic anionic emulsifier. About 50.5% solids, pH of 2.5. Tg of +45° C. Brookfield Viscosity (centipoises) Spindle No. 1, 60 rpm, of 140.

DETD TRITON CF-32: Amine polyglycol condensate, nonionic, cloud point of 25° C., pH of 10. Low foam emulsifier and stabilizer. Rohm and Haas Co.

DETD TAMOL 960: Sodium salt of a carboxylated acrylic polymer, pH of 7.0. Dispersing agent. Rohm and Haas Co.

CLM What is claimed is:

1. An aqueous composition of matter comprising a blend of two polymeric latices containing a minor amount by weight of a heat sensitizer sufficient to gel said composition on heating, (A) the polymer of one of said latices of said composition comprising a carboxylated copolymer of (1) at least 45% by weight of a monomer selected from the group consisting of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methylmethacrylate and ethylmethacrylate and mixtures thereof, (2) a copolymerizable monomer selected from the group consisting of acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid and crotonic acid and mixtures thereof in an amount of up to 10% by weight and (3) the balance, in an amount sufficient to provide some flexibility to and for vulcanization of the copolymer, a copolymerizable monomer selected from the group consisting of butadiene-1,3, isoprene, 2,3-dimethyl-butadiene-1,3, and piperylene and mixtures thereof, said copolymer of (A) having a glass transition temperature of not less than about -30° C., and (B) the polymer of the other of said latices of said composition consisting essentially of a copolymer of (1) from about 50 to 70% by weight of at least one acrylate selected from the group consisting of methyl acrylate and ethyl acrylate. (2) from about 25 to 40% by weight of at least one alkacrylate selected from the group consisting of methyl methacrylate, ethyl methacrylate and methyl ethacrylate and (3) from about 3 to 7% by weight of acrylamide, said copolymer of (B) having a glass transition temperature of not less than about +30° C., the parts by weight ratio of the copolymer of (A) to the copolymer of (B) being from about 50:50 to 85:15 on a dry basis.

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L18 ANSWER 7 OF 15 USPATFULL on STN

ACCESSION NUMBER: 84:14461 USPATFULL

TITLE: Coating rubber with a composition which resists removal by water

INVENTOR(S): Kuan, Tiong H., Stow, OH, United States

PATENT ASSIGNEE(S): Sommer, John G., Hudson, OH, United States
The General Tire & Rubber Company, Akron, OH, United States (U.S. corporation)

| | NUMBER | KIND | DATE |
|-----------------------|---|------|--------------|
| PATENT INFORMATION: | US 4436857 | | 19840313 |
| APPLICATION INFO.: | US 1981-290637 | | 19810806 (6) |
| RELATED APPLN. INFO.: | Continuation of Ser. No. US 1980-213433, filed on 5 Dec 1980, now abandoned which is a continuation of Ser. No. US 1979-93771, filed on 13 Nov 1979, now abandoned which is a division of Ser. No. US 1979-21380, filed on 19 Mar 1979, now patented, Pat. No. US 4217395, issued on 12 Aug 1980 which is a continuation-in-part of Ser. No. US 1978-931597, filed on 7 Aug 1978, now abandoned | | |
| DOCUMENT TYPE: | Utility | | |
| FILE SEGMENT: | Granted | | |
| PRIMARY EXAMINER: | Michl, Paul R. | | |
| NUMBER OF CLAIMS: | 5 | | |
| EXEMPLARY CLAIM: | 1 | | |
| LINE COUNT: | 923 | | |

CAS INDEXING IS AVAILABLE FOR THIS PATENT.

- AB A carboxylated polymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the polymer and which also can contain fillers, wetting agents and stabilizers can be used to provide a water resistant film on the surface of a with rubber compound or composition which subsequently can be cooled rapidly with water and dried. The resulting latex coated rubber can then be stacked or assembled without sticking.
- SUMM U.S. Pat. No. 2,791,519 discloses a lacquer comprising a solution of a copolymer of 40-80% butadiene, 10-50% acrylonitrile, and 2-25% methacrylic acid dissolved in a solvent to be used as a coating for cured or uncured curable rubber compositions to improve the abrasion resistance and gloss of such rubber articles as hose, fuel cells, auto mats, seat covers, shoe soles and uppers and tires. While silica and some compounding ingredients can be added to the lacquer, materials which react with the COOH groups are less suitable. If uncured, the lacquer coating can be removed by a solvent. Example 3 shows application of the lacquer to a curable rubber stock which was vulcanized and shows after curing the removal of the lacquer by a solvent.
- SUMM U.S. Pat. No. 4,092,279 (O.G. May 30, 1978) shows a coating for treating the outer surface of a rubber article prior to vulcanization comprising an aqueous composition of 2-70% solids of (A) a rubber from a latex (natural, conjugated diene polymers, copolymers of dienes, and copolymers of dienes and styrene, substituted styrene, acrylic and methacrylic acid, esters, nitriles and amides thereof and vinyl pyridine), (B) emulsifying agents, (C) graphite, carbon black or mineral fillers, (D) a thickening agent and (E) casein.
- SUMM Japanese Patent Specification No. 057625 (May 22, 1974) discloses a process for preventing sticking of rubber sheets or granules together by passing the rubber through a dip tank comprising an aqueous dispersion of 10% light calcium carbonate and 0.2% (rubber solids) of a butadiene-styrene copolymer (latex; 23.5% styrene). The latex, also, can be a polyisoprene, polybutadiene, acrylonitrile-butadiene copolymer or polychloroprene latex (0.1- 5 wt. % solids rubber in the dispersion). The filler, also, can be talc, clay, silica or magnesium carbonate and can be present in the dispersion in an amount of 1-30 wt. %.

SUMM According to the present invention it has been found that a carboxylated polymer latex containing a minor amount by weight of a heat sensitizer sufficient to gel the polymer particles of the latex on the application of heat, preferably containing also fillers, stabilizers and wetting agents, can be used, to form an adherent water resistant coating on a hot rubber surface which subsequently can be water cooled, by dipping, preferably by spraying, dried and assembled without danger of the rubber (layers) sticking to itself. The film formed on heat drying resists removal by water spray. Film formation is believed due to the heat from the freshly mixed (milled or worked) rubber. The film is adherent to the rubber and prevents layers of rubber from sticking together. Also, any filler in the rubber latex is effectively bound by the carboxylated polymer on drying so that dusting does not occur to any appreciable extent when a filler is present in the coating. The use of the present process thus provides a method for increasing the production of a Banbury.

SUMM The carboxylated polymer is prepared by free radical aqueous emulsion copolymerization. It should be capable of forming an essentially non-tacky, essentially water insoluble film when cast as a latex and dried, and the copolymer per se should be sulfur vulcanizable and have a glass transition temperature (T_g) of not less than about -30° C. The copolymer contains (1) at least 45% by weight of styrene, vinyl toluene, acrylonitrile, methacrylonitrile, acrylamide, methacrylamide, methylmethacrylate, or ethyl methacrylate or mixture thereof, (2) up to 10% by weight of a copolymerizable acidic monomer like acrylic acid, methacrylic acid, ethacrylic acid, maleic acid, fumaric acid, itaconic acid, citraconic acid, sorbic acid or crotonic acid or mixture thereof, and (3) the balance a copolymerizable conjugated diene monomer in sufficient amount by weight to afford some flexibility and to provide for vulcanization, crosslinking or curing, e.g., sulfur, or peroxide curing, such as butadiene-1,3, isoprene, 2,3-dimethyl-butadiene-1,3, or piperylene or mixture thereof. Very minor amounts of a 4th, 5th etc., monomer such as methyl acrylate, hydroxy ethyl acrylate, and so forth can be copolymerized with the above monomers so long as these additional monomers do not adversely affect the properties of the resulting copolymer or latex. Methods for making carboxylated polymers are disclosed in U.S. Pat. Nos. 2,604,668; 2,669,550; 2,710,292; 2,724,707; 2,849,426; 2,868,754; 3,392,048; 3,404,116; 3,409,569 and 3,468,833; in "Rubber World," September, 1954, pages 784 to 788; and in "Industrial and Engineering Chemistry," May 1955, pages 1006 to 1012. Mixtures of carboxylated latices may be used. While an ester of the acid or its anhydride etc., can be copolymerized instead of the acid and then hydrolyzed and neutralized to form free acid groups in the copolymer, this procedure is not as convenient as directly copolymerizing the acidic monomer with the other copolymerizable monomers.

SUMM NaOH, KOH, NH₄ OH and so forth may be added to the polymerization reactor before, during or after polymerization to control the pH as desired. Polymerization may be conducted under acidic conditions.

SUMM The water should be free of deleterious materials, and preferably should be distilled or ion exchanged. Sufficient water is used to enable formation of the emulsion and to enable proper mixing or stirring of the ingredients during polymerization to obtain the desired rate and degree of polymerization, heat transfer and so forth. The solids content (after removal of water) of the resulting latex, thus, may vary from

about 25 to 60% by weight, and the pH can be from about 7.5 to 11.5.

SUMM While the above carboxylated latex or a mixture of the above latices can be used alone for the dip, it is preferred to employ a compounded latex. In other words, it is preferred to compound the latex with rubber fillers or extending agents along with the desired rubber stabilizers including chelating and/or sequestering agents, wetting or dispersing agents, suspending agents, defoamers, antisticking agents, antioxidants, bactericides, and the like to provide a stable, filled, compounded latex composition which has good covering power and which provides a nontacky, nonsticky or releasable, but adherent coating, film and/or layer on a hot tacky rubbery substrate when dried. Some latex compounding ingredients are shown by "Materials, Compounding Ingredients and Machinery for Rubber," "Rubber World" publication, 1977, Bill Communications, Inc., New York.

SUMM The fillers which are desirably added to the latex to extend it are nonblack, inorganic rubber compounding pigments or fillers. The fillers, also, may help as antisticking agents and may serve to thicken the latex as well as to modify the viscosity of the latex. The filler should be finely divided. Examples of fillers are calcium carbonate, clay, precipitated hydrated silica, fumed silica, mica, barytes, perlite, magnesium silicate or talc, feldspar, hydrous calcium magnesium silicate, magnesium carbonate, magnesium oxide, titanium dioxide, and the like and mixtures of the same. Of these materials it is preferred to use calcium carbonate, clay, fumed silica or hydrated precipitated silica and mixtures thereof. These fillers are used in an amount necessary to provide the desired extension, thickening, viscosity and/or additional anti-sticking properties for the latex and to reduce cost. Too large an amount should be avoided since the rubber particles of the latex (rubber dispersion or suspension) on drying will not be present in sufficient amount to form a film and to bind all of the filler particles together to the substrate. In general the amount of filler can vary from about 150 to 1,000 parts by weight per 100 parts by weight of dry copolymer (from the latex).

SUMM The other, as mentioned above, latex compounding ingredients (besides the pigments) are used in a minor amount by weight as compared to the copolymer (dry basis). They are desired (for example, in addition to any stabilizers, emulsifiers etc., used during polymerization) to further stabilize the latex in view of the addition of the fillers. These other compounding ingredients may provide more than one function in the latex, e.g., they may act as dispersing agents as well as wetting agents. In general, these other compounding ingredients such as stabilizers and wetting agents are used in an amount of from about 1 to 30 parts by weight per 100 parts by weight of the copolymer on a dry basis. Examples of some of these other latex compounding ingredients are anti-foaming or defoaming agents such as polyalkylene-ether glycols, triols and tetrols, 2,4,7,9-tetramethyl-5-decyn-4, 7-diol, Defoamer Y-250 (blend of emulsifiable mineral oil, silica derivatives and esters, Drew Chemical Corp.), and the like. Examples of some stabilizing, dispersing and wetting agents are sodium linoleate, octylphenoxy polyethoxy ethanol, polyoxypropylene oxyethylene glycol, casein, alkyl aryl sulfonates, sodium dioctyl sulfosuccinate, sodium salt of polymerized alkyl naphthalene sulfonate, sodium stearate, and nonyl phenol and the like and mixtures thereof. Examples of some suspending and organic thickening agents are ammonium poly acrylate, sodium polyacrylate, hydroxyethyl

cellulose, potassium alginate, polysaccharides, sodium alginate and the like and mixtures thereof. Examples of some antisticking agents are zinc stearate, saponified fatty acids and so forth.

SUMM The heat sensitizer is required so that the copolymer will form a film (coagulate or gel) at the desired temperature, e.g., on contacting the hot rubber stock. The heat sensitizer, also, acts to form (accelerate) a stronger film faster at a given temperature and thus reduces time of processing. Examples of heat sensitizers are the zinc ammine system, polyvinyl methylether, polypropylene glycol, 2-nitro-2-methyl-2-propanol and so forth. Polyoxy propylene oxyethylene glycols and similar alkylene oxide polyols, also, may act as heat sensitizers. The heat sensitizer is used in a minor amount by weight dry as compared to the polymer of the latex sufficient to gel or coagulate the polymer. Preferably, there are used about 0.75 to 15 parts by weight of the sensitizer to 100 parts by weight of the carboxylated polymer on a dry weight basis. Mixtures of heat sensitizers can be used.

SUMM A minor amount by weight (up to about 25% by weight on a dry weight basis) of the carboxylated latex may be replaced with other polymeric latices which are compatible with the carboxylated latex and the rubber stock to be dipped and which when mixed with the carboxylated latex do not cause the overall rubber mixture to have a combined glass transition temperature below about -30° C. Examples of such other latices are those of polybutadiene, polyisoprene, natural rubber, butadiene-styrene copolymer, butadiene-acrylonitrile copolymer, butadiene-styrene-acrylonitrile copolymer, butadiene-acrylic ester copolymer, polychloroprene, ethylene-propylene-diene copolymers (EPDM), isobutylene-isoprene copolymers, butadiene-styrene-vinyl pyridine copolymer, chlorobutyl rubber, bromobutyl rubber and so forth and mixtures thereof. Some of these polymers may be made by solution processes and then converted to emulsions by processes well known to the art.

SUMM For more information on methods of compounding and treating latex or latices see "Latex In Industry," Noble, 2nd Ed., 1953, Rubber Age, Palmerton Publishing Co., New York and "High Polymer Latices," Blackley, 1966, Vols. 1 and 2, MacLauren & Sons Ltd., London.

SUMM The amount of water used in making or added to the compounded latex will depend on the desired viscosity, handling characteristics of the compounded latex, the thickness of the film which it is desired to lay down on the rubber substrate and the time required for drying and film formation. Thin films and low viscosity compounded latices are desirable; however, these properties may vary considerably with needs, coating equipment, storing, pumping, speeds of coating, drying times and temperatures, film thickness and so forth. In general, the total solids content in the aqueous compounded latex may be from about 10 to 75%, preferably from about 10 to 40%, by weight. Deionized or distilled water should be used as the diluent to avoid introducing extraneous ions which might cause instability to the latex, resulting film and so forth.

SUMM The compounded aqueous latex dip may be applied to the rubber substrate by dipping, spraying, roller coating, painting or by any means which will provide a suitable coating. Thin coatings are preferred since they will gel in a short time. On the other hand, while thick coatings may be used, only the surface layers nearest to or adjacent the rubber

stock may be gelled in sufficient time so that the bulk of the coating may be washed off during the subsequent water (spray or dip) cooling step. Moreover, excess dip coating may require further compounding of the rubber stock itself to overcome the effects of the dip coating if the rubber compound is further mixed with curing agents such as sulfur and rubber accelerators. In general, not over about 7%, preferably not over about 2%, by weight dry of the dried latex composition from the dip on the rubber stock substrate will be enough to prevent sticking.

SUMM While the dip of the present invention can be applied to any polymeric surface and heated to prevent sticking of the surfaces, it is particularly applicable to rubber stocks which have been Banburied, masticated, milled or which are freshly mixed and hot so that their surfaces are sticky or tacky. The stocks may be in the form of milled, masticated or broken down rubber, partially or fully compounded with carbon black, zinc oxide, stearic acid, silica, extender oil, styrenated phenol antioxidant and so forth. Examples of the rubber polymers which may be used in the stocks are natural rubber, polyisoprene, polybutadiene, butadiene-styrene copolymer, butadiene-acrylonitrile copolymer, butadiene-styrene-acrylonitrile copolymer, butadiene-acrylic ester copolymer, polychloroprene, ethylene-propylene-diene copolymers (EPDM), isobutylene-isoprene copolymers (butyl), chlorinated butyl, brominated butyl, butadiene-styrene-vinyl pyridine copolymers, carboxylated butadiene-acrylonitrile copolymers, carboxylated butadiene polymers, carboxylated butadiene-styrene copolymers and the like and mixtures thereof. While the process of the present invention is particularly useful for treating hot rubber which has just been Banburied and passed through a sheeting mill to form a continuous hot sheet or slab, it will be appreciated that it can apply to any milled, extruded, calendered, laminated or warmed, tacky rubber stocks to prevent the rubber stocks from sticking together when piled, shelved or stored awaiting subsequent processing, e.g., the manufacture of tires, belts and so forth. Moreover, while the dip of the present invention is useful with slab, strip or sheet rubber stock, especially in continuous form, it, also, can be used on separate pieces, formed or not, or in the form of powders, pellets, crumb or particles and so forth to prevent them from sticking together.

SUMM In one embodiment of the present invention the hot (about 90°-150° C.) masticated rubber stock from the Banbury is passed through a sheeting mill to form a continuous hot sheet or slab and the continuous hot slab is dipped in a dip tank containing the latex slab dip composition of this invention for about 1 second or so and is then allowed to air dry for 30 to 40 seconds or until at least about 80% of the water has evaporated (preferably all the water should evaporate) and the heat sensitizer in the latex has caused it to coagulate or gel. The gelled latex composition coated slab is then sprayed with water for about 30 to 40 seconds to cool it down without removing the latex coating and then air dried and stacked at a lay down temperature of about 50° C. maximum, preferably of about 45° C. maximum, (to prevent scorch) to form stacks or layers of rubber which do not stick together. During air drying step and water spraying step the rubber sheet or slab may be carried on a series of rotating shafts with long loops between the shafts (festooned) to save space.

SUMM Since the carboxylated latex may be sensitive to extraneous ions such as metallic cations which may cause it to coagulate or cause

the precipitation of soaps, the dipping tank and piping, stirrers, pumps and so forth which may be used in connection with a dip tank should preferably contain a protective coating such as an epoxy resin, glass etc. and chelators and/or sequestering agents should preferably be added to the carboxylated latex dip etc. If stirring or agitating means are available and used continuously or when needed, filler suspending agents for the filled latex may not be necessary.

SUMM 1. The latex was diluted with the predetermined amount of deionized water using moderate stirring.

SUMM 7. Stirring was maintained until the latex dispersion appeared homogeneous.

SUMM The viscosity of the slab dips was measured using the Brookfield viscometer. Model HB was used for high viscosity dips while model LV was used for the low viscosity dips. The rate of shearing and spindle type used were dictated by the nature of the dip. The slab dip formulation should be stable mechanically under conditions of high shear rate agitation. To establish this about 100 cc of the slab dip was stirred vigorously (3,300-3,500 rpm) using a "milk shake" type apparatus while observing for a change in the slab dip.

SUMM pH determination of the slab dips were made by means of pH indicating paper strips.

SUMM Then the freshly milled rubber samples were dipped in a bath of the latex slab dip composition for about 1 second, dried in air at about 25° C. for about 30 seconds, cooled in water at about 25° C. for 30 seconds, and then dried in air for 60 seconds and stacked.

DETD The following ingredients were mixed together to form slab dips having a total solids content (TSC) of over 50% as shown in Table I below:

DETD TABLE I

| Ingredients | Parts by Weight | | |
|--------------------------------|-----------------|-------|-------|
| | Run 1 | Run 2 | Run 3 |
| Latex | 100 | 100 | 100 |
| "Valpro" SD | 1.5 | 1.5 | 1.5 |
| "Plurronics" L101 | 1.5 | 1.5 | 1.5 |
| Sodium lauryl sulfate | 1.0 | 1.0 | 1.0 |
| Kaolin clay | -- | -- | 150 |
| Whiting | 300 | 300 | -- |
| "Cab-O-Sil" M5 | 2.5 | 2.5 | -- |
| NMP | 1.5 | -- | 1.5 |
| 2.5% "Kelzan" aqueous solution | -- | 10 | -- |
| "Surfynol" 104H | -- | -- | 0.5 |
| Water (deionized) | 100 | 100 | 150 |
| Total | 508.0 | 516.5 | 406.0 |
| % TSC, by weight of dip | 70.6 | 69.2 | 50.9 |
| % Rubber, dry basis, by weight | 14.1 | 14.2 | 24.6 |
| in dip | | | |
| % Rubber, wet basis, by weight | | | |

10.0 9.8 12.5
in dip

DETD The stability of these latex dips, when exposed to a sandblasted steel panel, was poor. Destabilization obviously occurred after exposure overnight as indicated by the thick deposit on the surfaces of the panel. This problem was eliminated when a similar steel panel was coated with an epoxy based paint prior to exposure to the slab dips.

DETD The following ingredients were mixed together to form slab dips having varying TSC as shown in Table II, below:

DETD TABLE II

| Parts By Weight | | | | | |
|---------------------------|--------|--------|--------|--------|---------|
| Run No. | | | | | |
| Ingredients | 10 | 11 | 12 | 13 | 14 |
| Latex | 100 | 100 | 100 | 100 | 100 |
| "Valpro" SD | 1.0 | 1.0 | 1.0 | 1.0 | 1.0 |
| "Triton" X-114 | 0.5 | 0.5 | 0.5 | 0.5 | 0.5 |
| "Kelzan" | 0.25 | 0.25 | 0.25 | 0.25 | 0.25 |
| Whiting | 275 | 275 | 275 | 275 | 275 |
| "Cab-O-Sil" EH5 | 5 | 5 | 5 | 5 | 5 |
| NMP | 2 | 2 | 2 | 2 | 2 |
| Deionized water | 285.4 | 359.7 | 452.6 | 572.1 | 731.4 |
| Total | 669.15 | 743.45 | 836.35 | 955.85 | 1115.15 |
| % TSC, by weight | 50 | 45 | 40 | 35 | 30 |
| % Rubber (wet), by weight | 7.6 | 6.8 | 6.0 | 5.3 | 4.6 |
| % Rubber (dry), by weight | 15 | 15 | 15 | 15 | 15 |

DETD The weight of the rubber specimens used averaged 16.56 grams with deviations from this average of no more than 5%. It was apparent from the results shown that the deposit from the slab dips increases with increasing total solids content. An ideal dip would be one which works with the least amount of deposit from a cost standpoint. Inadequate wetting becomes a problem with increasing dilution. However, this can easily be circumvented by adjusting the amount of wetting agent accordingly. The increase in viscosity with increasing TSC is rather expected. The surfaces of the dried latex coated samples of Runs 10 to 13 were not tacky, and, also, the dried coatings were not removed on washing or rinsing in water. The wetting of Run 14 could be increased by adding more surfactant or wetting agent.

DETD The following ingredients were mixed together to form slab dips having constant TSC by keeping the latex content constant and by varying the whiting content and the water content as shown in Table III, below:

DETD TABLE III

| Ingredients | Parts By Weight | | |
|----------------------------|-----------------|-----------|----------------------------|
| | Run No. 20 | 21 | 22 |
| Latex | 100 | 100 | 100 |
| "Valpro" SD | 1.0 | 1.0 | 1.0 |
| "Triton" X-114 | 0.5 | 0.5 | 0.5 |
| "Kelzan" | 0.25 | 0.25 | 0.25 |
| Whiting | 275 | 210 | 185 -"Cab-O-Sil" EH5 5 5 5 |
| NMP | 2 | 2 | 2 |
| Water | 452.6 | 355 | 317.6 |
| Total | 836.35 | 673.75 | 611.35 |
| % TSC, by weight | 40 | 40 | 40 |
| % Rubber (dry), by wt. | 15 | 18.8 | 20.7 |
| % Rubber (wet), by wt. | 6 | 7.5 | 8.3 |
| Brookfield Viscosity Model | .about.30 | .about.40 | .about.25 |
| HB Spindle #1, 10 rpm | | | |
| Deposit of latex | 1.65 | 1.40 | 1.25 |
| compound on rubber | | | |
| % by wt. | | | |

DETD In contrast to previous examples, the amount of slab dips deposited on hot and dried carbon black filled natural rubber sample stocks appears to decrease with increasing rubber content. Closer examination of the formulations showed that the effect of the rubber content was actually confounded with the differences in the whiting level. The increase in rubber content was obtained at the expense of decreasing whiting level. Hence, the decrease in the amount of dip deposit with increasing rubber content may in some way be related to the decrease in the whiting level. The slab dips in Tables II plus II A and III, except Run 14 in Tables II plus II A, effectively prevented the rubbers from sticking in the bladder mold test. Based on the results of these examples, decreasing the solids content does not impair the slab dip performance. The surfaces of the dried latex coated rubber samples of this Example were not sticky nor tacky, and, also, after drying the surface films or coatings were not removed by treatment with water.

DETD In this example relatively low TSC slab dips were prepared in which were dipped natural rubber gum stocks or compounds as well as carbon black filled natural rubber stocks. The dried latex coated rubber samples were tested according to the bladder mold test mentioned above and all of the dried latex coated rubber samples of the runs of this example did not stick together, and even though the surface films were thin, they were uniform. Moreover, after drying, these surface films on the rubber stocks were not removed by water. The ingredients of the dips are shown in Table IV, below:

| Ingredients | Parts by Weight | | | |
|----------------|-----------------|-----|-----|-----|
| | Run No. 30 | 31 | 32 | 33 |
| Latex | 100 | 100 | 100 | 100 |
| "Valpro" SD | 2.5 | 2.5 | 2.5 | 2.5 |
| "Triton" X-114 | | | | |

| | | | | |
|-----------------|--------|--------|--------|--------|
| | 3.0 | 3.0 | 3.0 | 3.0 |
| Whiting | 430 | 430 | 430 | 450 |
| "Hi-Sil" 215 | 15 | -- | 15 | -- |
| Emulsion | -- | -- | 15 | -- |
| Zinc stearate | -- | -- | -- | 5.0 |
| "Gantrez" M-154 | 4.0 | 5.0 | 4.0 | 3.0 |
| Deionized water | 1972 | 1916 | 2032 | 2008 |
| Total | 2526.5 | 2456.5 | 2601.5 | 2571.5 |
| % TSC, by wt. | 20 | 20 | 20 | 20 |
| % Rubber (dry), | 10.05 | 10.3 | 9.8 | 9.9 |
| by wt. | | | | |
| % Rubber (wet), | 2.01 | 2.07 | 1.95 | 1.98 |
| by wt. | | | | |

-
- DETD The pH of the dips of this example ranged from 8.2 to 8.4. The heat sensitizer, "Gantrez", is most effective at a pH of about 8 although at a pH of above about 8 the compounded latex can become marginal in stability unless amply stabilized. The wetting agents in appreciable amounts are necessary to get good wetting at high filler loading (note Run 14).
- DETD With respect to the dips of the runs of this example all were vigorously stirred (3,300-3,500 rpm) between one half to about one hour using a milk shake type apparatus without any observable change in their appearance showing that they were resistant to destabilization at high speed agitation even at relatively low pH. Although foaming occurred in all instances due to air entrapment, the foams collapsed on standing. The dips of the runs of this example were aged in closed containers in an oven at 50° C., without any observed change after three weeks. Thus the dips can be stable to the pumping, stirring, and temperatures which might be encountered in storage and in dipping during tire factory operations.
- DETD Specimens of uncoated steel panels were immersed in the slab dips of this example, and no change was observed after the first 3 days. Later some green deposits started to appear on the steel and the pH of the dips was found to be reduced from above 8 as shown above to slightly above 7. In contrast to these observations there was no apparent change in the physical state of painted steel panels when immersed in these dips, and the pH of the dips was unchanged after immersion for a week.
- DETD A rubber slab (natural rubber-carbon black masterbatch) was dipped in a slab dip the same as Run 31 above but at a somewhat higher total solids content, dried and cooled. The coated slab and a similar uncoated slab were separately mixed, based on 100 parts by weight of the rubber slab, with 5 parts of zinc oxide, 2 parts of stearic acid, 0.5 part of MBT, and 2.5 parts of sulfur. The resulting compounded slabs were then each molded, cured and tested. The results are shown in Table IV, A below:
- DETD A run was made using the same dip as Run 31 but with a slightly higher concentration of whiting. The rubber stock was milled, calendered and extruded as a tire puncture sealing strip and passed through the dip, dried, cooled with water, dried and piled up on itself or stacked. After several hours (overnight), it was inspected and the lengths or strips of the coated rubber puncture sealant compound could readily be separated

from each other or unstacked. The puncture sealant is of a type which flows excessively in storage. This experiment indicates the importance of compliance and retention of film contiguity that the film from the present slab dip possesses since a non-film forming dip would not work in the case of such a rubber compound which was an oil extended ethylene-propylenediene monomer rubber composition (see U.S. Pat. No. 3,903,947).

DETD V-2. This dip not only deposited more solids on the rubber which can adversely affect vulcanizate properties for some applications, but it is readily removed by water washing.

DETD The following ingredients were mixed together to form a slab dip as shown below:

DETD

| Ingredient | Parts By Weight |
|------------|-----------------|
|------------|-----------------|

| | |
|------------------------------|-----------------|
| Latex | 100 |
| Aluminum silicate, hard clay | 430 |
| "Valpro" SD | 3 |
| "Sequestrene" NA3 | 0.5 |
| "Lubrex" PE-40 | 12 |
| "Triton" X-114 | 4 |
| NMP | 2 |
| Y-250 | 0.1 |
| Deionized Water | 1915 |
| Total Solids content of | |
| | 20% by weight |
| Rubber wet basis | 2.0% by weight |
| Rubber dry basis | 10.1% by weight |

DETD In summary, slab dips have been disclosed which when deposited on the surface of rubber compounds, become resistant to removal by water spray. The dips are based on a carboxylated polymer latex and a heat sensitizer and preferably contain suitable wetting agents, stabilizers and fillers. The high temperature of the freshly-mixed rubber compound causes the slab dip to form an adherent, nontacky water resistant film. The film deposited on the rubber compounds effectively prevents the layers of rubber from sticking during stacking and storage. The dips are low in cost and are easy to prepare. The rubber compound containing the film from the dip can be reprocessed easily with no adverse affect on the final vulcanizate properties based on laboratory tests.

DETD Latex of Examples I to V--Aqueous emulsion free radical polymerized high molecular weight carboxylated butadiene-styrene copolymer containing about 55% by weight styrene, not over about 5% by weight total of methacrylic and itaconic acids and the balance butadiene-1,3. Polymer Tg of about -20° C., about 50% solids, pH of 9.0, Brookfield viscosity (#2 @ 60 LVF) of 70, and surface tension of 54.0. Contains antioxidant. Binder and film former.

DETD Latex of Example VI--Aqueous emulsion free radical polymerized high molecular weight copolymer of about 64% by weight of styrene, about 2% by weight total of a mixture of itaconic acid and methacrylic acid, and the balance butadiene- 1,3. About 50% by weight solids, pH of 9. Brookfield LVF viscosity #2 @ 60 of 60 to 90. Tg of about--15.9° C. by Differential Thermal Analysis and Tg of about--10.2° C. by Differential Scanning Calorimetry.

CLM What is claimed is:

1. A composition of matter comprising a compounded aqueous polymeric latex containing a carboxylated copolymer having a glass transition temperature of not less than about -30° C., and in

PATENT ASSIGNEE(S): Zeon Corporation, Tokyo, JAPAN (non-U.S. corporation)

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CAS INDEXING IS AVAILABLE FOR THIS PATENT.

TI Latex for dip forming and molded object
obtained by dip forming

AB A latex for dip forming which comprises a
copolymer prepared by polymerizing 10 to 90% by weight of a conjugated
diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid
monomer and 10 to 89.9% by weight of other ethylenically unsaturated
monomer or monomers copolymerizable therewith, wherein the sum of the
amount of acid groups bonded to or adsorbed on the surface of the
copolymer constituting the latex and the amount of acid groups
present in the aqueous phase of the copolymer latex is in the
range of 0.1 to 2 meq. in terms of hydrochloric acid, per gram of the
copolymer. This latex is dip-formed to
give a dip-formed article having no fear of
development of a protein allergy, and exhibiting a soft feeling and a
high mechanical strength.

SUMM This invention relates to a dip-formed article, and
a latex for dip forming. More
particularly, it relates to a dip-formed article
which has no fear of development of an allergy to protein, has soft
feeling and has a high mechanical strength, and to a latex for
dip forming which is used for making the dip
-formed article.

SUMM Hitherto, rubber gloves have been made widely by dip-
forming a composition comprising a natural rubber latex
having incorporated therein a vulcanizer such as
sulfur. However, there has been a problem such that, when they
are brought into contact with a human body, an allergy reaction develops
due to natural proteins contained in natural rubber latex,
which causes efflorescence and itching.

SUMM Dip-formed articles have also been made by
dip-forming a composition comprising a carboxylic
acid-modified nitrile copolymer latex such as an acrylic
acid-acrylonitrile-butadiene copolymer latex, having
incorporated therein zinc oxide as a

vulcanizer. The resulting dip-formed articles exhibit enhanced oil resistance and mechanical strength, and thus, are suitable for use in a working area using an organic solvent, but have a problem in that their feeling is rough.

- SUMM To obviate these problems, there have been proposed a method of dip-forming alternately a natural rubber latex and a carboxylic acid-modified nitrile copolymer latex to superposed rubber layers; and a method of dip-forming a mixed latex of a carboxylic acid-modified nitrile copolymer latex with a carboxylic acid-modified synthetic cis-1,4-polyisoprene rubber latex (Japanese Unexamined Patent Publication No. S53-101036). The former method using a natural rubber latex still has a problem of development of a protein allergy. Both methods use different kinds of latexes, and thus, the production step is complicated and the productivity is low.
- SUMM In view of the foregoing, a primary object of the present invention is to provide a dip-formed article which has no fear of development of an allergy to protein, has soft feeling and has a high mechanical strength, and to provide a latex for dip forming which is used for making the dip-formed article.
- SUMM The present inventors made extensive researches to achieve the above-mentioned object, and found that the amount of acid groups present on the surface of a copolymer constituting a latex and the amount of acid groups present in the aqueous phase in the copolymer latex influence the feeling of a dip-formed article. The present invention has been completed based on this finding.
- SUMM Thus, in accordance with the present invention, there is provided a latex for dip forming characterized in that the latex comprises a copolymer prepared by polymerizing 10 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 10 to 89.9% by weight of other ethylenically unsaturated monomer or monomers copolymerizable therewith, wherein the sum of the amount of acid groups bonded to or adsorbed on the surface of the copolymer constituting the latex and the amount of acid groups present in the aqueous phase of the copolymer latex is in the range of 0.1 to 2 milli-equivalent (hereinafter abbreviated to "meq.") in terms of hydrochloric acid, per gram of the copolymer.
- SUMM In accordance with the present invention, there is further provided a dip-formed article which is made by dip-forming the above-mentioned latex for dip forming.
- DRWD FIG. 1 is a diagram showing the change of electric conductivity of latex depending upon the accumulative amount of hydrochloric acid added.
- DETD The dip-forming latex of the present invention is prepared by copolymerization of 10 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 10 to 89.9% by weight of other ethylenically unsaturated monomer or monomers copolymerizable therewith.
- DETD The amount of the conjugated diene monomer may be varied within the above-specified range depending upon the particular kind of other ethylenically unsaturated monomer or monomers used in combination with

the conjugated diene monomer. For example, when an ethylenically unsaturated nitrile monomer is used as the other ethylenically unsaturated monomer, the amount of the conjugated diene monomer is preferably in the range of 30 to 90% by weight and more preferably 35 to 80% by weight. When an aromatic vinyl monomer is used as the other ethylenically unsaturated monomer, the amount of the conjugated diene monomer is preferably in the range of 10 to 90% by weight and more preferably 20 to 80% by weight. When the amount of conjugated diene monomer is too small in these cases, the feeling of a dip-formed article becomes rough. In contrast, when the amount of conjugated diene monomer is too large, the tensile strength and tear strength are reduced.

DETD The ethylenically unsaturated acid monomer is not particularly limited provided that it has an acidic group such as, for example, a carboxyl group, a sulfonic acid group or an acid anhydride group. As specific examples of the ethylenically unsaturated acid monomer, there can be mentioned ethylenically unsaturated monocarboxylic acid monomers such as acrylic acid and methacrylic acid; ethylenically unsaturated polycarboxylic acid monomers such as itaconic acid, maleic acid, fumaric acid and butenetricarboxylic acid; partial ester monomers of ethylenically unsaturated polycarboxylic acids such as monobutyl fumarate, monobutyl maleate and mono-2-hydroxypropyl maleate; ethylenically unsaturated polycarboxylic acid anhydride monomers such as maleic anhydride and citraconic anhydride; ethylenically unsaturated sulfonic acid monomers such as styrenesulfonic acid, vinylsulfonic acid, methylvinylsulfonic acid, allylsulfonic acid, methallylsulfonic acid, acrylic acid-2-sulfonic acid ethyl, methacrylic acid-2-sulfonic acid ethyl, and 2-acrylamide-2-hydroxypropanesulfonic acid; ethylenically unsaturated phosphoric acid monomers such as acrylic acid-3-chloro-2-phosphoric acid propyl, methacrylic acid-3-chloro-2-phosphoric acid propyl, acrylic acid-2-phosphoric acid ethyl, methacrylic acid-2-phosphoric acid ethyl and 3-allyloxy-2-hydroxypropanephosphoric acid. These monomers may be used in the form of an alkali metal salt or an ammonium salt. These monomers may also be used either alone or as a combination of at least two thereof. Of these, ethylenically unsaturated monocarboxylic acids are preferable because the resulting dip-formed article has well balanced feeling and tensile strength. Methacrylic acid is especially preferable.

DETD The amount of the ethylenically unsaturated acid monomer is in the range of 0.1 to 20% by weight, preferably 1 to 15% by weight and more preferably 2 to 10% by weight, based on the total weight of the monomers. When the amount of the ethylenically unsaturated acid monomer is smaller 0.1% by weight, the tensile strength of a dip-formed article is reduced. In contrast, when the amount of the ethylenically unsaturated acid monomer is larger 20% by weight, the tear strength of a dip-formed article is reduced and the feeling thereof becomes rough.

DETD The other ethylenically unsaturated monomer used includes, for example, ethylenically unsaturated nitrile monomers, aromatic vinyl monomers, ethylenically unsaturated acid derivative monomers and crosslinking monomers. The kind and amount of these monomers may appropriately be varied depending upon various properties such as feeling, oil resistance and mechanical strength required for the object dip-formed article. Ethylenically unsaturated nitrile monomers are preferable because of excellent oil resistance.

DETD The ethylenically unsaturated nitrile monomers are not particularly limited, and, as specific examples thereof, there can be mentioned acrylonitrile, methacrylonitrile, fumaronitrile, α -chloracrylonitrile and α -cyanoethylacrylonitrile. Of these,

acrylonitrile is preferably used. The amount of the ethylenically unsaturated nitrile monomers may appropriately be varied depending upon the properties required for the objective dip-formed article. The amount of the ethylenically unsaturated nitrile monomers is preferably in the range of 9 to 50% by weight and more preferably 20 to 45% by weight, based on the total weight of the monomers. When the amount of the ethylenically unsaturated nitrile monomer is too small, the oil resistance of a dip-formed article becomes poor. In contrast, when the amount of the ethylenically unsaturated nitrile monomer is too large, the feeling of a dip-formed article becomes rough.

DETD As specific examples of the aromatic vinyl monomer, there can be mentioned styrene, methylstyrene, vinyltoluene, chlorostyrene and hydroxymethylstyrene. Of these, styrene is preferable. The amount of the aromatic vinyl monomers may appropriately be varied depending upon the properties required for the objective dip-formed article. The amount of the aromatic vinyl monomers is usually in the range of 10 to 89.9% by weight and preferably 20 to 80% by weight, based on the total weight of the monomers. When the amount of the aromatic vinyl monomer is too small, the feeling of a dip-formed article becomes extremely soft. In contrast, when the amount of the aromatic vinyl monomer is too large, the feeling of a dip-formed article becomes rough.

DETD In the dip-forming latex of the present invention, the sum of the amount of acid groups bonded to or adsorbed on the surface of the copolymer constituting the latex and the amount of acid groups present in the aqueous phase of the latex is in the range of 0.1 to 2 milli-equivalent (meq.) preferably 0.15 to 1.8 meq., in terms of hydrochloric acid, per g of the copolymer. When the sum of the acid groups is smaller than 0.1 meq., the resulting glove is not crosslinked to the desired extent and its tear strength becomes poor. Further, the colloid stability of latex become poor and thus, when a crosslinker or other ingredients are incorporated, coagulation sometimes occur. In contrast, when the sum of the acid groups is larger than 2 meq., the content of hydrophilic ingredients is undesirably large and, when a glove is immersed in water, the strength thereof tends to be reduced.

DETD The method for controlling the total amount of acid groups within the above-specified range is not particularly limited, but, usually the total amount of acid groups can be controlled by a method of choosing the kind and amount of ethylenically unsaturated acid monomers for copolymerization, and the time at which the monomers are added to a polymerization system. In addition to these methods, a method of choosing the kind and amount of an emulsifier and a polymerization initiator, and a method of adjusting the pH value of a polymerization system can also be employed.

DETD To provide a glove having a uniform thickness, the dip-forming latex of the present invention preferably has chemical stability index values CS1 and CS2 satisfying the following formulae (1):

DETD wherein CS1 is a value of the minimum concentration of a NaCl solution at which a latex having a solid content of 5% by weight can be coagulated. CS1 is measured by a method wherein a plurality of NaCl solutions having different concentrations increasing stepwise by 0.1% by weight are prepared, 30 ml of each NaCl solution was placed in a beaker having a volume of 100 ml, and one drop (about 0.2 cm^{sup.3}) of a latex having a solid content of 5% by weight is dropwise added to each NaCl solution in a beaker. CS1 is defined as the minimum concentration of a NaCl solution at which the drop of latex is capable of being coagulated.

- DETD CS2 is a value of the minimum concentration of a NaCl solution at which a latex having a solid content of 45% by weight can be coagulated. CS2 is measured by a method wherein a plurality of NaCl solutions having different concentrations increasing stepwise by 0.1% by weight are prepared, 30 ml of each NaCl solution was placed in a beaker having a volume of 100 ml, and one drop (about 0.2 cm.^{sup.3}) of a latex having a solid content of 45% by weight is dropwise added to each NaCl solution in a beaker. CS2 is defined as the minimum concentration of a NaCl solution at which the drop of latex is capable of being coagulated.
- DETD When CS2 value decreases, the chemical stability of latex is reduced, and a coagulum tends to be produced at a step of adding zinc oxide or a sulfur dispersion, and the dip forming property is deteriorated with the result of reduction of uniformity in film thickness. When CS1 value increases, the chemical stability increases and the film-forming property is deteriorated, and, when a mold is taken out after dipping in a latex, a coating of the latex is not coagulated and flows down with the result of also reduction of uniformity in film thickness.
- DETD The method of controlling the chemical stability of latex is not particularly limited. For example, the chemical stability of latex can be varied by choosing the amount of an ethylenically unsaturated acid monomer in the monomer mixture, or the amount of an emulsifier used for polymerization of the monomer mixture, or controlling pH of a copolymer latex.
- DETD The dip-forming latex of the present invention is usually prepared by an ordinary emulsion polymerization procedure. The temperature for emulsion polymerization is usually in the range of 0 to 100° C. When the emulsion polymerization is carried out at a temperature not higher than 45° C., a dip-formed article having high mechanical strength and good feeling can be easily obtained. The manner in which the monomer mixture is added is not particularly limited. For example, the monomer mixture is added in a lot or continuously in a polymerization reactor, or a part of the monomer mixture is charged in a polymerization reactor and then the remaining part is continuously added.
- DETD The polymerization initiator used for polymerization is not particularly limited, and, as specific examples thereof, there can be mentioned inorganic peroxides such as sodium persulfate, potassium persulfate, ammonium persulfate, potassium perphosphate and hydrogen peroxide; organic peroxides such as diisopropylbenzene hydroperoxide, cumene hydroperoxide, t-butyl hydroperoxide, 1,1,3,3-tetramethylbutyl hydroperoxide, 2,5-dimethylhexane-2,5-dihydroperoxide, di-t-butyl peroxide, di- α -cumyl peroxide, acetyl peroxide, isobutyryl peroxide and benzoyl peroxide; and azo compounds such as azobisisobutyronitrile, azobis-2,4-dimethylvarelonitrile and methyl azobisisobutyrate. These polymerization initiators may be used either alone or as a combination of at least two thereof. Of these, peroxide initiators are preferable because a copolymer latex can be stably produced and a dip-formed article having high mechanical strength and soft feeling can be obtained. The amount of polymerization initiator is varied to some extent depending upon the particular kind of initiator, but is preferably in the range of 0.01 to 0.6% by weight based on the monomer mixture.
- DETD The polymerization is carried out usually until a conversion of at least 90%, preferably at least 95% and more preferably at least 99% is reached. The obtained copolymer latex usually has a particle diameter in the range of 0.07 to 0.3 μm , preferably 0.08 to 0.2 μm . When the particle diameter is too small, the viscosity of

latex is too high, and the latex becomes difficult to handle and the compounding stability becomes poor. In contrast, when the particle diameter is too high, the film-forming property of latex is reduced.

DETD The dip-forming latex of the present invention preferably contain a phenolic compound having a function of radical chain termination as an antioxidant. The phenolic compound does not contaminate a dip-formed article, exudes a smell only to a minor extent, and, even when the dip-formed article is subjected to a chlorination treatment in the after-treatment step, it is not subject to pink staining, namely, the dip-formed article exhibits good resistance to pinking. Note, the chlorination treatment is a method of providing a slip finish on a dip-formed article so that the closely contacted inner surfaces thereof do not stick to each other.

DETD Instead of the phenolic compound, an aromatic amine compound can also be used. But, an aromatic amine compound tends to contaminate a dip-formed article and is liable to exude a smell. A compound exhibiting a function of peroxide decomposition can also be used as an antioxidant, but, this compound causes yellow discoloration due to heat and ultraviolet rays, and its antioxidation effect is minor with a single use thereof.

DETD Among the phenolic compounds, preferable are those which are solid at room temperature and have a melting point which is lower than the highest temperature to which the copolymer is exposed in the course of producing a dip-formed article. Usually the highest temperature to which the copolymer is exposed in the course of production of a dip-formed article is about 120° C. If an antioxidant is liquid at room temperature, the antioxidant exudes a smell. If an antioxidant has a melting point higher than 120° C., the antioxidant is not melted at the step of dip-forming, and thus, the antioxidant is not homogeneously infiltrated in the dip formed article. In consideration of these characteristics, 2,6-di-t-butyl-4-methylphenol and a butylated reaction product of p-cresol with dicyclopentadiene are especially preferably used.

DETD The amount of antioxidant can be determined depending upon the properties required for the objective dip formed article, but is preferably in the range of 0.1 to 3 parts by weight, and more preferably 0.3 to 1 part by weight, based on 100 parts by weight of the solid content of latex. If the amount of antioxidant is too small, heat discoloration and UV discoloration are liable to occur, and the mechanical strength tends to be reduced. In contrast, if the amount of antioxidant is too large, the effect of improving the resistance to heat discoloration and the resistance to light coloration, and enhancing the mechanical strength retention is reduced.

DETD The method by which the antioxidant is added is not particularly limited, but, usually, in view of ease in mixing with a latex, the antioxidant is added in a form of liquid dispersion such as an emulsion or a dispersion. The liquid dispersion is prepared usually by an emulsifying method or a pulverizing method.

DETD The dip formed article of the present invention is made by dip forming the above-mentioned dip-forming latex by an ordinary procedure. Usually a form is dipped in a bath of dip-forming liquid formulation whereby a layer of a latex is deposited on the surface of the form, and then the form having the latex layer is taken out from the bath and then the latex layer is dried. As specific examples of the dip forming method, there can be mentioned a direct dipping method, an anode

- coagulation dipping method, and a teague coagulation dipping method.
- DETD The dip-forming liquid formulation usually comprises a dip-forming latex, and ingredients such as a vulcanizer (crosslinking agent), a vulcanization auxiliary for crosslinking the latex with a metal ion, a vulcanization accelerator, and a base as pH adjuster. The dip-forming latex of the present invention may be used either alone or as a combination of at least two thereof. Other latexes can be used in combination with the latex of the present invention provided that the object of the present invention can be achieved.
- DETD In the present invention, sulfur or sulfur-containing compounds are used as a crosslinking agent. The amount of the crosslinking agent is usually in the range of 0.3 to 5 parts by weight, preferably 0.5 to 3 parts by weight, based on 100 parts by weight of the solid content in the latex. To more enhance the mechanical strength, a metal oxide such as zinc oxide, magnesium oxide or lead oxide can be added. Of these zinc oxide is especially preferable. The amount of the metal oxide is usually in the range of 0.1 to 5 parts by weight, preferably 0.5 to 3 parts by weight, based on 100 parts by weight of the solid content in the latex. When the amount of metal oxide is too small, the mechanical strength is poor. In contrast, when the amount of metal oxide is too large, the effect of mechanical strength improvement is not enhanced and the cost performance is reduced. Crosslinking can be effected only with the use of the metal oxide, but the crosslinked product is liable to have a rough feeling. Therefore, the metal oxide is preferably used in combination with sulfur to thereby form a sulfur crosslink as well as a metal crosslink.
- DETD In the dip forming, a form must be treated with a coagulating agent before or after the form is dipped in a dip-forming liquid formulation. The method of treating a form with a coagulating agent includes, for example, a method of dipping a form in a solution of a coagulating agent prior to dipping in the dip-forming liquid formulation whereby the coagulating agent is deposited on the form, and a method of applying a solution of a coagulating agent onto a form having deposited thereon a latex. As the coagulating agent, for example, a polyvalent metal salts such as calcium nitrate and calcium chloride are used.
- DETD After the form having deposited thereon the latex is taken out from the dip-forming liquid formulation, the form is subjected to a warm water treatment or a heat treatment whereby unreacted monomers and excessive ingredients are removed and a crosslinking reaction of copolymer is promoted. The method for heat treatment or warm water treatment is not particularly limited, and, as specific examples thereof, there can be mentioned a method of dipping the latex-deposited form in a warm water bath, a method of blowing warm air against the latex-deposited form, and a method of irradiating the latex-deposited form with infrared rays.
- DETD By the above-mentioned methods, a dip-formed article of the present invention is made. The shape of the dip-formed article is not particularly limited, and includes, for example, a fingerstall, a thin-gage glove, a medium-gage glove, a supported glove, a nipple for nursing bottle, a squirt, a water-pillow, a catheter, a balloon, a toy balloon and a doll. The dip-forming latex of the present invention is especially useful for a thin-gage glove having a wall-thickness of 0.1 mm to 0.3

mm. This thin-gage glove has no fear of development of an allergy to protein, has soft feeling and has a high mechanical strength, and therefore, the glove is especially suitable for surgical operation and diagnosis.

DETD If desired, the surface of the dip formed article of the present invention can be coated with finely divided inorganic particles such as talc particles or calcium carbonate particles; starch powder; finely divided organic particles such as polystyrene particles; or silicone oil.

DETD Parts and percents in examples and comparative examples are by weight unless otherwise specified. The weight of a latex is expressed in terms of the weight of the solid content.

DETD Properties of latexes and dip-formed articles were evaluated by the following methods.

DETD (1) Total Amount of Acid Groups per Gram of Copolymer Latex

DETD The total amount of acid groups in a copolymer latex is determined by measuring the change of electrical conductivity of the copolymer latex as observed when hydrochloric acid is added to the latex according to the method for measurement of the amount of acid groups present on the surface of the copolymer and the amount of acid groups present in the aqueous phase of the copolymer latex. The change of electrical conductivity depending upon the amount of hydrochloric acid added is illustrated in FIG. 1.

DETD A glass vessel having an inner volume of 150 ml is washed with distilled water, and 50 g of a copolymer latex having a solid content of 2% is placed in the glass vessel. The vessel is set to an electric conductivity meter (CM-117 available from Kyoto Denshi Kogyo K.K., type of cell: K-121). The content of the vessel is stirred and the stirring is continued until the addition of hydrochloric acid is completed. 0.1 N aqueous solution of sodium hydroxide (special grade reagent, available from Wako Pure Chem. Ind., Ltd.) is added, and, when 6 minutes elapse from the addition of sodium hydroxide, electric conductivity is measured. The electric conductivity is herein called as an electric conductivity at the commencement of measurement. Then 0.5 ml of 0.1 N aqueous hydrochloric acid (special grade reagent, available from Wako Pure Chem. Ind., Ltd.) is added to the copolymer latex so that the electric conductivity of the latex is in the range of 2.5 to 3.0 (mS), and, 30 seconds after, electric conductivity is measured. This procedure of addition of 0.1 N hydrochloric acid and measurement of electric conductivity is repeated at an interval of 30 seconds until the electric conductivity value reaches the electric conductivity at the commencement of measurement.

DETD The amount of acid groups present on the surface of the copolymer per g of the copolymer, and the amount of acid groups present in the aqueous phase of the copolymer latex per g of the copolymer are obtained, in terms of amount (milli-equivalent [meq.]) of hydrochloric acid, from the following formulae (a) and (b), respectively.

DETD (b) Amount of acid groups in the aqueous phase of latex per gram of copolymer = $A_{\text{sub.3}} - A_{\text{sub.2}}$

DETD Therefore, the total amount of acid groups per gram of copolymer latex is the sum of (a) plus (b), as expressed by the formula (c).

DETD (c) Total amount of acid groups per gram of copolymer latex = $(a) + (b)$ (c)

DETD A dumbbell specimen is cut out from a dip formed article by a dumbbell die No. 2 (small size). Tensile strength at an elongation of 300% is measured at a grip separation rate of 500 mm/min. The smaller the value for tensile strength at 300% elongation, the softer the feeling

DETD A plurality of aqueous NaCl solutions having different concentrations

increasing stepwise by 0.1% by weight are prepared. 30 ml of each aqueous NaCl solution was placed in a beaker having a volume of 100 ml, and one drop (about 0.2 cm.^{sup.3}) of a latex is dropwise added to each aqueous NaCl solution in the beaker. The CS value is defined as the minimum concentration of the aqueous NaCl solution at which the drop of latex is coagulated. The measurement is carried out by using two latexes having different solid concentrations (i.e., solid concentrations of 5% and 45%). The CS values for the two latexes having a concentration of 5% and 45% are referred to CS1 value and CS2 value, respectively. The latex having a solid concentration of 5% is prepared by diluting the latex having a solid concentration of 45% with soft water.

- DETD A solid film layer of a latex is formed on the surface of a glove form and then the thus-formed dip-formed article having a glove shape is stripped from the glove form. The state and appearance of the stripped glove are observed, and evaluated according to the following three ratings.
- DETD A line is drawn on a dip-formed article, and film thickness is measured at 20 points on the line. Average film thickness and standard deviation are calculated. The film thickness is expressed by the average thickness, and the monodisperse ratio of the film thickness is expressed by the ratio in percent obtained by dividing the standard deviation by the average film thickness. The smaller the monodisperse ratio, the better the uniformity of film thickness.
- DETD A circular specimen having a diameter of 20 mm is cut out from a dip-formed article. The specimen is immersed in predetermined oil at 25° C. for 48 hours. The area of the immersed specimen is measured. The oil resistance is expressed by the areal swelling ratio (%) as defined by the value (%) obtained by dividing the difference between the area before immersion and the area after immersion by the area before immersion. The smaller the obtained value, the better the oil resistance.
- DETD A specimen of a dip-formed article is placed in an oven, and is maintained at 160° C. for 10 minutes in an air atmosphere. Then yellow index (Y.I.) is measured by a differential colorimeter (available from Suga Shikenki K.K.). The smaller the Y.I. value, the better the heat discoloration resistance.
- DETD (10) Light Discoloration Resistance A specimen of a dip-formed article is irradiated with ultraviolet rays at 63° C. for 16 hours in an air atmosphere by using a light resistance tester (long life type, available from Suga Shikenki K.K.). Then yellow index (Y.I.) is measured by a differential calorimeter. The smaller the Y.I. value, the better the heat discoloration resistance.
- DETD A free chlorine solution is prepared by mixing 99 parts of an aqueous 5% sodium hypochlorite solution and 1 part of conc. hydrochloric acid. A dip-formed article is immersed in the free chlorine solution for 48 hours. Then the specimen is taken out and washed with an aqueous 2% ammonia solution and further with water. The washed specimen is dried by a tumbler at 50° C. The reddishness (a* value) of the dried specimen is measured by a differential calorimeter. The smaller the a* value, the better the pinking resistance.
- DETD Unreacted monomers were removed from the thus-obtained copolymer latex, and pH and concentration of the latex were adjusted to give a copolymer latex A having a solid concentration of 45% and a pH value of 8.3. Properties of the latex are shown in Table 1.
- DETD 1.0 part of sulfur, 1.0 part of zinc oxide, 1.0 part of titanium oxide, 0.03 part of potassium hydroxide and 3.2 part of water were mixed together to give a liquid dispersion of vulcanizer having a solid concentration of 50%. 7 parts of the

liquid dispersion of vulcanizer was mixed together with 220 parts of latex A having a solid concentration of 45% to give a dip-forming liquid formulation.

DETD 20 parts of calcium nitrate, 0.05 part of a nonionic emulsifier ("Emulgen-810".TM. available from Kao Corporation) and 80 parts of water were mixed together to give a coagulating solution having a solid concentration of 20%. A glove form was dipped in the coagulating solution for 1 minute, and then taken out from the coagulating solution. Then the glove form was dried at 20° C. for 3 minutes whereby a coagulant was deposited on the glove form. The glove form having a coagulant deposited thereon was dipped in the above-mentioned dip-forming liquid formulation for 6 minutes, taken out from the liquid formulation, and then dried at 20° C. for 3 minutes. The glove form was further dried at 8° C. for 20 minutes in a drier, and then heat-treated at 120° C. for 25 minutes to form a solid film layer on the glove form. Finally the solid film layer was stripped from the glove form to obtain a dip-formed article of a glove shape. The evaluation results of the dip-formed article are shown in Table 1.

DETD The procedures for preparing copolymer latex A, described in Example 1, were repeated wherein the monomer composition was varied as shown in Table 1 with all other conditions remaining the same. Thus copolymer latexes B through G each having a solid concentration of 45% and a pH value of 8.3 were prepared. Properties of these latexes are shown in Table 1.

DETD By the same procedures as described in Example 1, dip-formed articles were made wherein latexes B through G were used instead of latex A. The evaluation results of the dip-formed articles are shown in Table 1.

DETD From the results shown in Table 1, dip-formed articles made from the copolymer latexes of the present invention in Examples 1 to 4 have a soft feeling and high tensile strength and tensile strength after immersion in water. In contrast, when latex E having a small total acid group content is used, the resulting dip-formed article has a soft feeling, but its tensile strength and tensile strength after immersion in water are low (Comparative Example 1). When latex F and Latex G, which have a large total acid group content, are used, the resulting dip-formed articles have a high tensile strength, but their feeling is rough and their tensile strength after immersion in water is low (Comparative Examples 2 and 3).

DETD
TABLE 1

Example Comparative Ex.
Example No. 1 2 3 4 1 2 3

Monomers (parts)

Acrylonitrile 34 -- 45 -- -- 20 25

Styrene -- 20 -- 50 50 -- --

1,3-Butadiene 59 65 50 48 50 50 60

Methacrylic acid 7 15 -- -- -- 30 5

Acrylic acid -- -- 5 2 -- -- 10

Latex A B C D E F G

Properties of latex

Total acid group 1.07 1.51 1.02 0.46 0.02 3.25 2.44

Content (meq.)

Properties of dip-formed
article

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Feeling (kg/cm.sup.2) 46 38 52 30 10 100 82
Tensile strength 360 310 370 250 60 540 480
(kg/cm.sup.2)
Tensile strength after 250 200 260 240 51 90 120
Water immersion
(kg/cm.sup.2)

DETD The procedures for preparing copolymer latex A, described in Example 1, were repeated wherein the monomer composition was varied as shown in Table 2 with all other conditions remaining the same. Thus copolymer latexes H through M were prepared. The adjusted pH value of latex M was 5.6.

DETD The total acid group contents of latexes H to M are in the range of 0.15 to 1.8 meq. CS1 values and CS2 values of latexes H to M were measured. The results are shown in Table 2.

DETD By the same procedures as described in Example 1, dip-formed articles were made wherein latexes H through M were used instead of latex A, and 7 parts of the liquid dispersion of vulcanizer having a solid concentration of 50% was used which was prepared by mixing 1.0 part of sulfur, 1.5 parts of zinc oxide, 0.7 part of titanium oxide, 0.03 part of potassium hydroxide and 3.2 part of water. The evaluation results of the dip-formed articles are shown in Table 2.

DETD
TABLE 2

Example
Example No. 5 6 7 8 9 10

Monomers
(parts)
Acrylonitrile 35 45 35 40 20 30
1,3-Butadiene 50 50 63 57 70 60
Methacrylic 15 5 2 3 10 10
acid
Latex H I J K L M
Properties
of latex
CS1 value (%) 2.7 2.3 2.2 1.4 3.3 1.9
CS2 value (%) 2.2 1.7 1.5 0.6 2.5 1.2
Properties of
dip-formed
article
Film forming a a a c b c
property
Film thickness 0.2 0.26 0.29 0.45 0.18 0.32
(mm)
Monodisperse 6 4.5 3.8 2.8 12.2 3.5
ratio of film
thickness (%)
Feeling 60 44 38 40 54 57
(kg/cm.sup.2)
Tensile 420 340 300 310 390 400
strength
(kg/cm.sup.2)
Oil resistance, 2 0 2 2 3 2
JIS #3 oil
Cuttlefish oil 11 4 12 12 12 11
Gasoline 23 12 22 21 26 23
DETD From the results shown in Table 2, dip-formed

articles made from copolymer latexes H to J having a CS1 value of not larger than 3.0% and a CS2 value of at least 1.5% in Examples 5 to 7 have an excellent uniform-film-forming property.

Dip-formed articles made from copolymer latexes K and M having a CS2 value of smaller than 1.5% have poor uniform-film-forming property, and, to make a dip-formed article having good uniform-film-forming property, it was necessary to use a larger amount of latex (Examples 8 and 10).

A dip-formed article made from copolymer latex L having a CS1 value of larger than 3.0% has somewhat poor uniform-film-forming property, and, to make a dip-formed article having good uniform-film-forming property, it was necessary to use a larger amount of latex (Example 9).

DETD The procedures for preparing copolymer latex A, described in Example 1, were repeated wherein the monomer composition was varied as shown in Table 3 to prepare copolymer latexes N through T. In these Examples, 0.5 part of an antioxidant, shown in Table 3, was added to 100 parts (as solid content) of latex with all other conditions remaining the same. By substantially the same procedures as described in Example 1, dip-formed articles were made from the antioxidant-added latexes instead of latex A.

DETD Properties of the resultant dip-formed articles were evaluated. The results are shown in Table 3. All of the dip-formed articles exhibited excellent uniform-film-forming property, a soft feeling, high tensile strength, and high tensile strength after immersion in water.

DETD As seen from the results shown in Table 3, when a phenolic compound is added, the obtained dip-formed articles exhibit good heat discoloration resistance, light discoloration resistance and pinking resistance (Examples 11 to 13). When an aromatic amine compound is added, the obtained dip-formed articles exhibit good heat discoloration resistance and light discoloration resistance, but the pinking resistance is somewhat poor (Examples 14 and 15). When a dithiocarbamic acid salt having a function of peroxide decomposition is added, the heat discoloration resistance, light discoloration resistance and pinking resistance of the dip-formed article are inferior to those of the dip-formed articles obtained with a phenolic compound (Example 16).

DETD

TABLE 3

Example

Example No. 11 12 13 14 15 16

Monomers (parts)

Acrylonitrile 23 -- 45 -- 34 20

Styrene -- 44 -- 42 -- --

1,3-Butadiene 65 50 53 56 59 68

Methacrylic acid 12 6 2 2 7 12

Latex N P Q R S T

Antioxidant Ph Ph Ph Amine Amine NDTCM

*1 *2 *3 *4 *5 *6

Melting point 172 115 <30 44 225 85
(° C.)

Method of Bead Bead Emul- Emul- Bead Bead
dispersion *7 mill mill sion sion mill mill

Properties of dip-
formed article

Heat discoloration 56.8 55.2 55.7 55.4 55.9 65.3

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Resistance

Light 52.7 50.9 51.2 50.3 51.9 60.2

discoloration

resistance

Pinking resistance 0.18 0.10 0.12 3.21 3.12 2.10

Note, Antioxidant

Ph *1: 2,5-di-t-amylhydroquinone

Ph *2: Butylated reaction product of p-cresol with dicyclopentadiene

Ph *3: Butylated nonylated phenol

Amine *4: N-phenyl-N'-(1,3-dimethylbutyl)-p-phenylenediamine

Amine *5: N,N'-di-2-naphthyl-p-phenylenediamine

NDTCM *6: Nickel dithiocarbamate

Method of dispersion *7:

Bead mill: Pulverization method using a bead mill

Emulsion: Emulsifying method

DETD According to the present invention, a dip-formed article having no fear of development of an allergy to protein, and exhibiting a soft feeling and a high mechanical strength can be obtained. Further, a latex for dip forming is provided which is used for making the dip-formed article.

CLM What is claimed is:

1. A latex for dip forming characterized in that the latex comprises a copolymer prepared by copolymerizing 10 to 90% by weight of a conjugated diene monomer, 0.1 to 20% by weight of an ethylenically unsaturated acid monomer and 10 to 89.9% by weight of other ethylenically unsaturated monomer or monomers copolymerizable therewith, wherein the sum of the amount of acid groups bonded to or adsorbed on the surface of the copolymer constituting the latex and the amount of acid groups present in the aqueous phase of the copolymer latex is in the range of 0.1 to 2 milli-equivalent in terms of hydrochloric acid, per gram of the copolymer wherein the latex for dip forming contains 0.1 to 3 parts by weight of a phenolic antioxidant, based on 100 parts by weight of the solid content in the copolymer latex

.

CLM What is claimed is:

2. The latex for dip forming according to claim 1, wherein the ethylenically unsaturated acid monomer is an ethylenically unsaturated monocarboxylic acid monomer.

CLM What is claimed is:

3. The latex for dip forming according to claim 1, wherein said other ethylenically unsaturated monomer or monomers comprises at least one monomer selected from the group consisting of ethylenically unsaturated nitrile monomers and aromatic vinyl monomers.

CLM What is claimed is:

4. The latex for dip forming according to claim 1, wherein the copolymer latex has chemical stability index values satisfying the following formulae (1): $1.5\% \leq CS_2$, and $CS_1 \leq 3.0\%$ (1).

CLM What is claimed is:

5. The latex for dip forming according to claim 1, wherein the antioxidant is solid at room temperature and has a melting point which is lower than the highest temperature to which the

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copolymer is exposed in the course of producing a dip-formed article.

CLM What is claimed is:
6. The latex for dip forming according to claim 1, wherein the antioxidant has been pulverized by a high-speed bead mill.

CLM What is claimed is:
7. A dip-formed article which is made by dip-forming the latex as claimed in claim 1.

CLM What is claimed is:
8. A thin-gage glove which is made by dip-forming the latex as claimed in claim 1.

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COST IN U.S. DOLLARS

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